

Global monthly E-magazine for Drones



# DRONES

## WORLD

₹ 250

VOL 04 ■ ISSUE 7  
AUGUST 2023

[WWW.dronesworldmag.com](http://WWW.dronesworldmag.com)



**Mr. Matthias Gronstedt**  
CEO HHLA Sky  
PG-32

**Mr. Amit Gupta**  
Managing Director, BBPL Aero Pvt Ltd  
PG-51



**Mr. Agnishwar Jayaprakash**  
Founder & CEO, Garuda Aerospace  
PG-17



**Ms. Shreya Rastogi**  
Founder & CEO  
S R Aerospace  
Solutions LLP  
PG-58



**Ravi Kondiparthi**  
Vice President  
Marvel Geospatial  
Solutions  
PG-48



**Mr. Bill Velkovski**  
Co-Founder & CEO  
Autono Drone  
PG-12



**Mr. GV Sreeramam**  
Founder & CEO  
NeoGeoinfo  
Technologies Pvt. Ltd.  
PG-42



## International Event for Internal Security of India

**26 27 28** OCT ' 2023

Pragati Maidan Exhibition Centre,  
New Delhi, India

Supported By:



MINISTÈRE  
DE L'INTÉRIEUR  
ET DES OUTRE-MER

*Liberté  
Égalité  
Fraternité*

# STRENGTH IN UNITY :

## COLLABORATING FOR INDIA'S INTERNAL SECURITY

**BOOK YOUR  
SPACE**

**EXHIBITOR QUERY**

Harish Khanduri  
(Project Manager)  
8800138543  
harish@interads.in

**VISIT THE  
SHOW**

**VISITOR QUERY**

Gayatri Chibba  
(Marketing Director)  
9810591686  
gayatri@interads.in

Scan Me



Media Partner :

**DRONES  
WORLD**

Organized By :



**INTER ADS  
EXHIBITIONS PVT. LTD.**



**MILIPOL**

**COMEXPOSIUM**

[www.milipolindia.com](http://www.milipolindia.com)

Rights to admission reserved with Inter Ads Exhibitions Pvt. Ltd., below 18 years of Age are not allowed.



## NASA and uAvionix Deploy SkyLine Command and Control Services at AAM Test Range

Page 23



## Aurora Develops Adaptive Control Architecture for Unmanned Surface Vessels

Page 31

## Teledyne FLIR Defense Wins \$94M IDIQ Contract from US Army for Black Hornet 3 Nano-Drones



Page 28

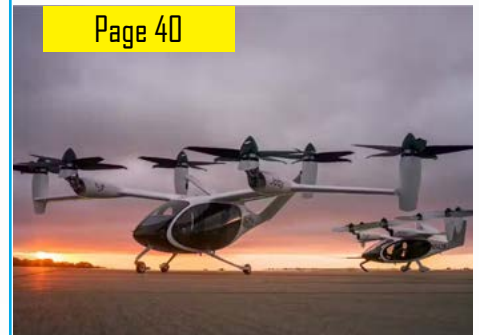


Dufour Aerospace announces selection of Aerolite as partner for composite structural parts

Page 7

Joby Marks Production Launch, Receives Permit to Fly 1st Aircraft Built on Production Line

Page 40



## Anduril and Epirus Integration Leads to New Counter-UAS Capability

Page 37



## Sentra Expands Mapping Capabilities with New Drone System

Page 47

# DRONES WORLD

**VOL 04 | ISSUE 7 | AUGUST 2023**

Editor-in-Chief ♦ B. Kartikeya

## EDITORIAL

Associate Editor ♦ Rohith Reddy

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

CREATIVE HEAD ♦ Swati Sharma (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 Joseph  
Tel : +33 758933925  
jubin.joseph@bluespacegroup.com  
SUBSCRIPTION : Sony

## EDITORIAL & ADVERTISING OFFICES DRONES WORLD

Villa No :105, Nakshatra Society, Siddanthi, Shamshabad,  
Hyderabad, Telangana 501218 For all magazine related enquires  
For all magazine related enquires  
E-mail: dronesworldmag@gmail.com

All information in Drones World is derived from sources, which we consider reliable and a sincere effort is made to report accurate information. It is passed on to our readers without any responsibility on our part. The publisher regrets that he cannot accept liability for errors and omissions contained in this publication, however caused. Similarly, opinions/ views expressed by third parties in abstract and/or in interviews are not necessarily shared by Drones World. However, we wish to advise our readers that one or more recognized authorities may hold different views than those reported. Material used in this publication is intended for information purpose only. Readers are advised to seek specific advice before acting on information contained in this publication which is provided for general use and may not be appropriate for the readers' particular circumstances.

Contents of this publication are copyright.

No part of Drones World or any part of the contents thereof may be reproduced, stored in retrieval system or transmitted in any form without the permission of the publication in writing. The same rule applies when there is a copyright or the article is taken from another publication. An exemption is hereby granted for the extracts used for the purpose of fair review, provided two copies of the same publication are sent to us for our records. Publications reproducing material either in part or in whole, without permission could face legal action. The publisher assumes no responsibility for returning any material solicited or unsolicited nor is he responsible for material lost or damaged. This publication is not meant to be an endorsement of any specific product or services offered. The publisher reserves the right to refuse, withdraw, amend or otherwise deal with all advertisements without explanation. All advertisements must comply with the Indian and International Advertisements Code. The publisher will not be liable for any damage or loss caused by delayed publication.

**DRONES WORLD is published by - B. Kartikeya**



**B. KARTIKEYA**

Most of the electronics market is dominated by commercial drones, which are also used more often for emergency response, news reporting, animal conservation, entertainment, and cinematography. Getting started could seem challenging if you want to express yourself artistically using a drone. However, we have made further simplifications in this new edition of Drones World. No longer is a pilot license required; all you need to fly these days is a drone and this magazine.

According to recent drone industry news, Dufour Aerospace has chosen Aerolite as a partner for composite structural parts. Aerolite's manufacturing plant in Horw, Switzerland, will be used to make the components. Furthermore, Singapore will soon roll out a vast drone Remote ID network covering the whole country's land surface.

Take a look at the seven exclusive interviews. The first interview is with Mr Bill Velkovski, co-founder and CEO of Autono Drone, and it will provide you with information about his expertise with UAVs. Mr Matthias Gronstedt, CEO of HHLA Sky, is the subject of the second interview. He is referring directly to the difficulties that the BVLOS drone sector faces. Amit Gupta, managing director of BBPL Aero Pvt Ltd, Mr GV Sreeramam, founder and CEO of NeoGeoInfo Technologies Pvt Ltd, Mr Agnishwar Jayaprakash, founder and CEO of Garuda Aerospace, and Ravi Kondiparthi, vice president of Marvel Geospatial Solutions, Ms. Shreya Rastogi Founder and CEO of SR Aerospace are among the other interviewees.

Don't forget to look at the articles in Counter Drones, EVTOL, CARGO, BVLOS, and GIS sections. It will inform you about the newest developments and offerings in the drone sector.

Lean back and unwind while we take you through the globe's sky as you catch a peek at the development and evolution of the drone industry from the drone's perspective.

*Kartikeya B.*





## PLANA and OneSky sign MOU for AAM aircraft operation

**P**LANA, a developer of Hybrid advanced air mobility (AAM) eVTOL, is joining forces with OneSky, a leading uncrewed aircraft systems traffic management (UTM) solution provider. PLANA announced on the 24th that it has signed a business agreement with OneSky at the PLANA Icheon R&D Center. The business agreement ceremony was attended by key officials from both companies, including PLANA CSO and co-founder Minyoung Ahn and OneSky CEO Robert Hammett. Through this business agreement, PLANA will participate in OneSky's Future of Flight program.

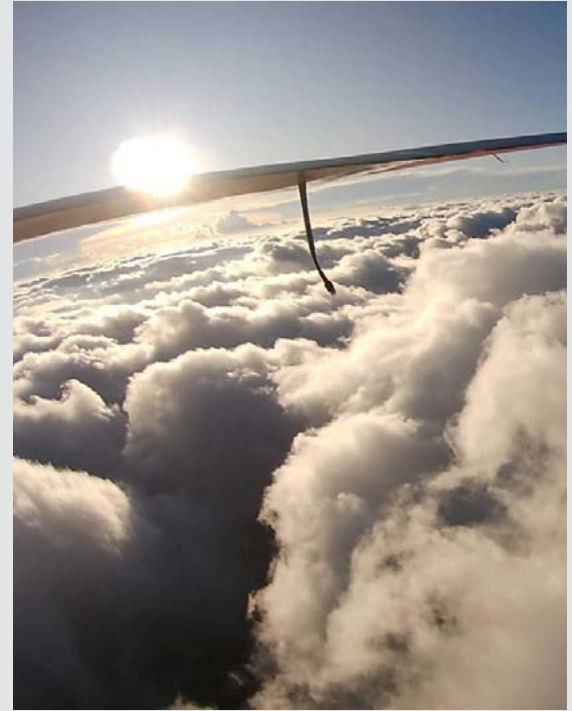
OneSky's Future of Flight program is a cooperative ecosystem of industry leaders and innovators that allows partners to come together to shorten the time it takes to get to scalable operations. Currently, more than 20 companies are participating in the program, including Skyports and Volatus, as well as Echodyne, a radar developer, and Supernal, Hyundai's UAM US subsidiary.

The two companies plan to create synergies by combining OneSky's airspace situational awareness, flight planning and simulation, UTM/UATM solutions with PLANA's expertise in developing and manufacturing hybrid-electric vertical takeoff and landing (eVTOL) aircraft. In addition, they plan to verify the operational concept of PLANA's CP-01 aircraft under development, refine the technical roadmap by coordinating technical requirements, explore solutions to AAM industry regulations in various countries, and discover business models.

Robert Hammett, OneSky CEO said, "Through this agreement, OneSky has secured an important partner in the operating of AAM aircraft. We will contribute to the evolving AAM industry by implementing safe aircraft operation through sharing know-how and cooperation between the two companies."

Minyoung Ahn, PLANA CSO and co-founder said, "For safe and efficient aviation of AAM aircraft, it is necessary to utilize UTM functions for automation and long-term processes including VFR. We expect to be able to acquire various technologies and know-how related to AAM aircraft operation through this cooperation."

## Mira Aerospace, a joint venture of UAVOS and Bayanat, Successfully Completed ApusDuo Solar Aircraft Test Flight



**M**ira Aerospace, a joint venture of UAVOS, a developer and manufacturer of advanced unmanned systems, and Bayanat, a part of the Abu Dhabi-based G42, announced a successful test flight of the ApusDuo solar-powered high-altitude pseudo satellite (HAPS).

The flight took place on June 8, 2023 at the Huye aerodrome, the Republic of Rwanda. With all basic aircraft tests for the ApusDuo HAPS now complete, Mira Aerospace will proceed with preparations for stratospheric test flights.

During this test flight the ApusDuo UAS reached altitudes of 16,686 m HMSL (height above mean sea level) and touched down at the departure runway in 10 hours and 30 min after takeoff. The ApusDuo HAPS successfully achieved a scope of test points, including flight stability check and controllability with a payload of 3,6 kg installed at high altitudes and C2 link performance evaluation (the communications link between a UAV and its ground station).

The UAVOS-designed avionics system demonstrated stable performance in extreme temperatures of minus 68 degrees centigrade. The UAVOS avionics system serves as the brain of the ApusDuo unmanned aircraft ensuring safe Beyond Visual Line of Sight (BVLOS) flight profiles throughout the various phases of lift-off, ascent and landing.

# uAvionix pingStation drives first ever approved UK CAA ADS-B Flight Information Display

The UK Civil Aviation Authority (CAA) has formally approved Manchester Barton Aerodrome's ADS-B Flight Information Display (FID) using the uAvionix pingStation to receive ADS-B position data from aircraft on the ground and flying in the vicinity of the airfield. The low-cost safety system provides real-time position data to air traffic staff operating in the tower and is the first ever FID approved for use in the UK under the CAA's new FID regulations.

The concept of a Flight Information Display is a recognition that the use of ADS-B OUT equipped aircraft enables low-cost airspace and aerodrome/airport situational awareness at a cost and scale not previously imagined. Prior to the advent and widespread adoption of ADS-B, multi-million-dollar radar solutions were required to provide surveillance capabilities. These technologies were cost prohibitive, leaving most aerodromes/airports without any technological surveillance capability at all, instead relying on the line-of-sight visual capabilities of controllers in combination with radio communications. Since ADS-B OUT equipment relies on readily available certified or qualified equipment broadcasting the aircraft's position from an approved high-integrity position source, the ground-based surveillance and display capability needed to provide situational awareness can be produced at a fraction of the cost of the legacy radar solutions.

Barton's FID uses a uAvionix pingStation to receive ADS-B position data that is passed to the local FID computer, which displays the traffic situation to the Flight Information Service Officer (FISO) in the tower. For many years, general aviation pilots have had access to technology, such as the uAvionix SkyEcho2, enabling them to receive and display the position of other ADS-B conspicuous aircraft flying nearby to help avoid collisions. The CAA approved FID now provides an equivalent low-cost capability for FISOs and Air Traffic Control Officers (ATCOs) in the airfield tower.



The new CAA FID regulations were developed following extensive UK trials that gathered data to validate the safety case for allowing non-radar rated FISOs and ATCOs to use ADS-B information for the reporting of traffic information to pilots. "The culmination of the trials, the announcement of the new regulations, and the Barton Aerodrome approval represent a significant enhancement to flight safety by bringing a low-cost surveillance solution to general aviation airfields using off the shelf hardware and applications that can be easily implemented," noted Steve Hutt, CEO of Custom Chess Company, who guided the effort at Barton Aerodrome and oversaw the creation of FID templated documentation as a shared resource for all UK airfields. A full technical report on the trial can be found at <https://airspace4all.org/reports/report-on-airspace4all-ga-airfield-ats-ads-b-traffic-display-trial/>.

The uAvionix pingStation 3, with a reception range of over 300 kilometers, receives ADS-B position data on both the 1090 MHz and 978 MHz frequencies. 978 MHz will become increasingly important in the UK as the CAA has announced the intention for uncrewed aircraft operating Beyond Visual Line Of Sight to use 978 MHz ADS-B for Electronic Conspicuity in support of detect and avoid (DAA) services. uAvionix technology was recently used for the first ever UK transmission of ADS-B OUT on 978 MHz for uncrewed DAA operations. Details of the uAvionix pingStation equipment can be found at [www.uAvionix.com](http://www.uAvionix.com). The company has been at the forefront of developing FIDs in the UK since 2017 and remains a leader in aviation-data-as-a-service through its growing list of communication, navigation, and surveillance products and services.





## Dufour Aerospace announces selection of Aerolite as partner for composite structural parts

**D**ufour Aerospace is happy to announce having selected Aerolite AG as main supplier for the lightweight composite structural parts for the nacelles and the tail of the Aero2 aircraft. The parts will be produced by Aerolite at their production facility in Horw, Switzerland.

Weight management and reduction is one of the keys to success in aviation engineering. Aerolite knows what it means to provide solid yet lightweight solutions and has years of experience as a supplier to the aviation industry.

Simon Bendrey, Head of Design of Dufour Aerospace, points out: "Aerolite are an established aerospace manufacturing company, holding DOA and POA for medical services interior assemblies. Applying this experience to their aircraft primary structure prototyping facility will support Dufour with the manufacture and assembly of high quality, light weight, production components for Aero 2. I look forward to working together with Aerolite on this exciting programme."

For the first phase of the collaboration, Dufour and Aerolite have agreed on the production and delivery of the nacelle and tail structural components for four Aero2 prototype aircraft, with the production of the serial aircraft also being considered.

Roland Hengartner, CEO of Aerolite, says: "Aerolite is proud to be a strategic supplier to Dufour to produce main eVTOL structural components for Aero2. We are convinced that our team has the necessary skills, experience and innovative spirit in the development and production of lightweight structure and components to support Dufour not only with Aero2, but also in future tasks."

## vHive Introduces Groundbreaking Turnkey Solution for the Wind Turbine Inspection



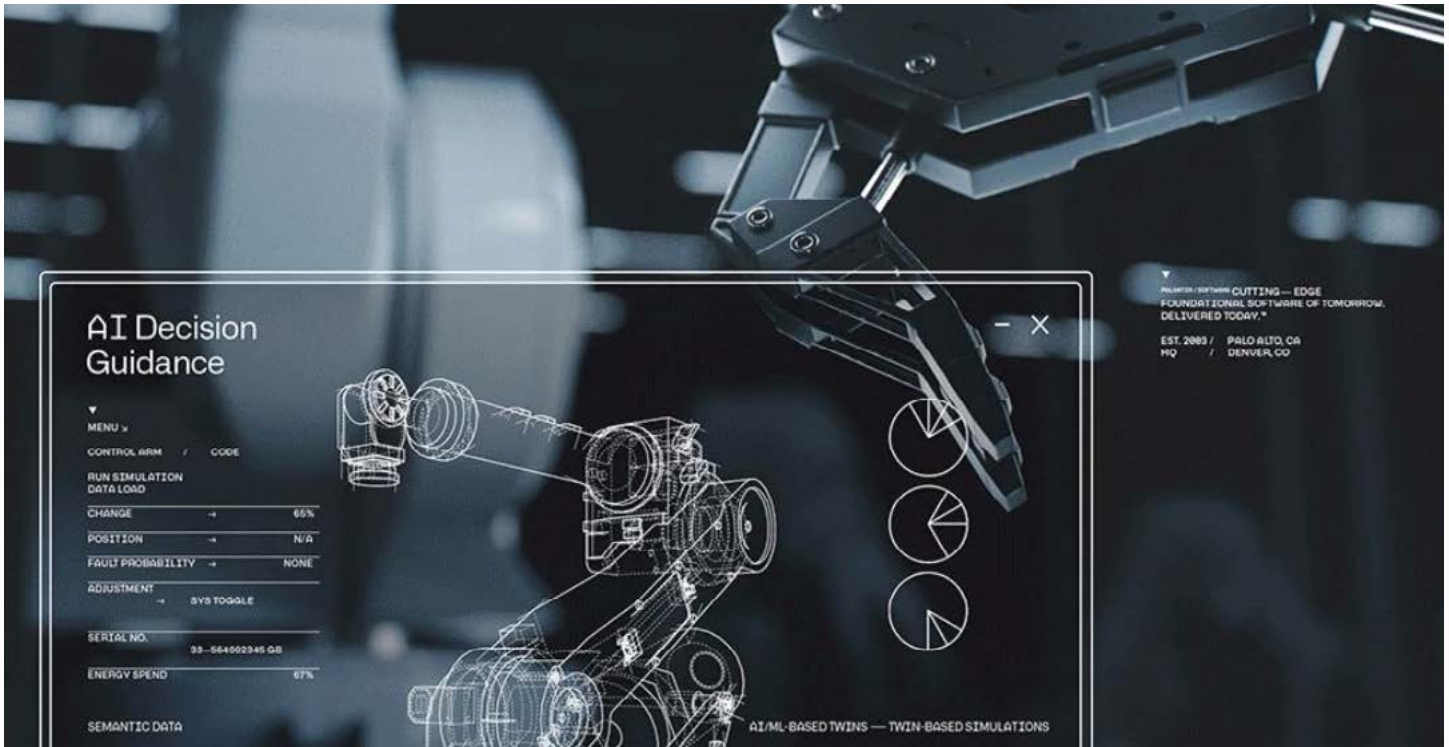
**V**hive, a market-leading software company specializing in enterprise asset digitization, proudly announces its innovative turnkey capabilities for the wind turbine industry. Leveraging its patented autonomous data capture technology, vHive enables precise and rapid capture of wind turbines at scale, reducing downtime and improving operational efficiency.

Traditional methods of capturing wind turbine field data such as climbing, ground-based zoom photo capture, and manual drone piloting have been time-consuming and costly. vHive's turnkey solution facilitates scalable and fast inspections without the typical need to repeatedly rotate the blades to inspect each of them independently. By leveraging low-cost, off-the-shelf hardware powered by vHive's autonomous multi-drone technology, downtime is significantly reduced. With drone pilot-independent operations eliminating the need for professional pilots, and increased accuracy through AI, wind farm operators can achieve consistent and comprehensive data gathering for repeatable and comparable analysis.

"We are excited to introduce our turnkey solution for the wind turbine industry," said Tomer Daniel, Co-Founder and CTO at vHive. Drawing on its proven track record in enterprise asset digitization across the infrastructure landscape, vHive offers a reliable and robust solution. With its extensive global footprint, vHive can support wind turbine farm owners and other key players in the wind industry in digitizing their assets worldwide. Its wide-ranging experience uniquely positions vHive to bring the benefits of its time-tested solution to the wind turbine sector.

"With ample room for growth in this rapidly expanding industry, wind farm operators continually seek cutting-edge technologies to enhance their efficiency," added CTO Daniel. "Our autonomous data acquisition and innovative Digital Twin platform offer a significant advantage over traditional methods, allowing wind farm operators to strategically digitize their assets, improve operational efficiency and minimize output degradation."

# Palantir and Toronto-based startup, AirMatrix, Announce Partnership



Palantir Technologies Inc. and AirMatrix, a trailblazer in airspace infrastructure technology announced a strategic partnership to accelerate and scale its drone operations by leveraging Palantir Foundry through the Foundry for Builders Program. The partnership will provide AirMatrix's clients with airspace security, including threat detection, compliance enablement, and risk mitigation through cutting-edge situational awareness available in the market globally.

With Foundry, AirMatrix's customers, which range from large city managers, airspace regulators, enterprises, drone pilots, airports, and defense organizations, will benefit from the partnership through bridging data integration and airspace security. The Foundry Ontology allows the extraction of valuable insights from complex data landscapes which AirMatrix proprietarily derives, including those relevant to autopilots in complex environments from updated urban data sets, micro-weather, millimeter-precise aerial coordinates, accurate maps, aerial uplink and downlink speeds, electromagnetic

interference, ground-based radar, radio-frequency interference, telecommunications data, and more. This stitching ultimately provides a comprehensive, real-time view of the client's airspace, enabling seamless, secure, and efficient operation of drones and other low-altitude vehicles between 0-1200 feet above ground level.

"We live in a world where drones are inevitable, our success as an organization is bound to a world where they are used for good, as much as artificial intelligence and humans can possibly help it, together," said Bashir Khan, CEO of AirMatrix.

AirMatrix joins a host of other Canadian businesses who work with Palantir from energy to financial services and manufacturing. Leveraging the Foundry for Builders Program, AirMatrix has begun enhancing both of its commercial drone software products, Libra, as well as Palladium. Libra is an advanced airspace management platform which gives civil authorities the ability to scale and manage drone traffic effectively, while generating revenue as commercial drones take to the sky. Palladium

is a software product which empowers drone operators to scale operations, fly drones legally, plan and execute missions, as well as manage 3D-optimized routes to the millimeter level.

"Palantir's commitment to solving the world's most complex problems is key to the partnership, as drone technology is increasingly being employed not only for beneficial outcomes in commercial applications but also for nefarious or illicit purposes," said David MacNaughton, Director & Head of Palantir Technologies Canada. "At Palantir Canada, we are excited to help AirMatrix accelerate and scale its business, leveraging local engineering expertise to help secure our airspace."

Backed by years of product development and hardened by major organizations around the world, Palantir Foundry is a full end-to-end platform that connects data and analytics with real world outcomes. Today, startups are leveraging Foundry as their core platform for combining disparate data, harmonizing it, and building applications faster and more sustainably than before.



# Revolution Aerospace Australia (RevAero) Enabling Regional Aerial Logistics and Air Taxi Operations



**R**evolution Aerospace (RevAero) is proud to announce the expansion of their Uncrewed Aerial Vehicle (UAV) based cargo delivery capability, with the recent procurement of the Anavia HT-100; lifting payloads over 55kg and with over 4 hours of endurance. The high-tech aircraft is manufactured in Switzerland, and due to be delivered in the second half of the year.

The platform significantly enhances RevAero's intent to transport meaningful payloads out to regional and remote communities and is a critical enabler for an 18-month program being undertaken with the support of the Department of Infrastructure, Transport, Regional Development, Communication, and the Arts (DITRDCA) under the Emerging Aviation Technologies Program (EATP). The project is titled 'Regional Aerial Logistics and Air Taxi Operations with Unified Traffic Management', where RevAero will demonstrate how the

distribution of people and product can be achieved, at scale.

The capstone activity for the project is a wide-scale demonstration in the Whitsunday region in early 2024. This demonstration will showcase end-to-end delivery of cargo, incorporating a variety of drone types, delivery distances and scenarios, in complex uncontrolled airspace environments. Several complex Beyond Visual Line of Sight (BVLOS) trials are being undertaken in the lead up to demonstration, advancing RevAero's test methodologies and building a layered safety case toward the eventual Demonstration.

Dr Terry Martin, RevAero Co-Founder and CEO commented on the HT-100: "The suite of research and flight testing we're undertaking will undoubtedly benefit regional and remote pockets of Australia. However, I can't emphasize enough how critical it is to choose the right technology for the task if we are to make our aspirations for

wide-scale cargo delivery to regional communities a reality. And that's why my team has put extensive effort into selecting appropriate aircraft and support equipment to get the job done, safely.

Our decision to select the ANAVIA HT-100 was driven by our confidence in both the technology ANAVIA has produced, but also the level of support they are providing to ensure we meet our operational requirements. The degree of design and systems engineering rigour, supported by quality manufacture and production processes means the platform is what we endearingly call "aviation grade".

This will be an increasingly important attribute, as we look to conduct more advanced operations under the JARUS SORA[1]. RevAero maintains open and regular communication with our regulator, who I have to say, have been exceptional in helping our staff navigate the regulatory approval process in areas never conducted before."

# Ondas Holdings' Airobotics Moves One Step Closer to Deploying Fully Automated Drones in US Cities After FAA Approved Noise Certification Standard For its Optimus System

Ondas Holdings Inc., a leading provider of private industrial wireless networks, commercial drones and automated data solutions, announced that the US Federal Aviation Administration (FAA) has approved the noise certification standards for its Optimus-1EX system in connection with the Type Certification process that Ondas' wholly-owned Airobotics began with the FAA in 2019. Meeting the noise requirements criteria is the final major step towards completing the Type Certification process that will allow the Optimus System to operate more broadly in urban environments in the US. This milestone would help fulfill the Company's vision of deploying fleets of Optimus systems as a permanent drone infrastructure for the purpose of providing Smart City, Public Safety, Drone as a First Responder (DFR), and other commercial and industrial aerial data services.

"We are looking forward to receiving the Type Certification for the Optimus System, which will be a significant benefit for our customers, both in the US and internationally," said Eric Brock, Chairman and CEO of Ondas. "The Optimus system is one of the most mature automated drone platforms in the market in terms of proven reliability, safety and value, and we believe that it will be a game-changing solution for local governments and commercial entities that are looking to streamline aerial data capture in American cities. The market for Urban Drone Infrastructure with Smart City and DFR use cases is immense and we are excited to drive adoption of our platform solutions in the US."

The Airobotics drone-in-a-box solution, which is already deployed in the United Arab Emirates (UAE) and Israel, relies on fleets of automated drones that do not require on-the-



ground human intervention to operate as a task force that can simultaneously collect and provide critical information for a variety of customer requirements. Each Optimus system, networked as fleet infrastructure, includes a smart airbase enabling automated battery changes for 24/7 operations, along with the automated loading and installation of sensors appropriate for each specified mission. Optimus drones cover up to 30 square miles surrounding an airbase. Drone flights can be tasked to carry specific sensors, enabling each drone within the fleet to execute diverse tasks. Drones can be activated for complex longer-term operations, with flights overseen by remote operators in a command-and-control center.

"From the very beginning of our journey, Airobotics has been aiming to deploy drones as city-wide infrastructure to help governments provide city services more efficiently, to improve public safety and security and other use cases," said Meir Kliner,

Airobotics' CEO. "With the completion of the noise certification standard, we are getting closer to completing this process, which will allow the Optimus system to operate in complex environments in the US. Flying drones beyond visual line of sight (BVLOS) is only one familiar problem, while crossing and flying above people, roads, and infrastructure are important operating challenges to solve. With Type Certification, we will be able to work with the FAA on much more complicated drone operations."

The rigorous FAA Type Certification process has only been completed by one drone company since the FAA began offering Type Certification for uncrewed aerial systems (UAS) in 2019. Airobotics, which is focused on capturing valuable data and information in urban environments, is one of the most advanced companies in the process of pursuing a Type Certificate with the FAA and expects to secure the formal Type Certificate during 2023.



# Singapore to Enhanced Airspace Security with City Wide Drone Remote ID Network



Singapore is set to launch a comprehensive drone Remote ID network, covering the entire land area of the island nation. As part of the initiative, 50 drone tracking sensors will be deployed by the end of 2024. The pilot phase, led by UK-based airspace management company Drone Defence Services, involves the installation of three AeroSentry Zero drone detection sensors at trial sites. This phase will demonstrate the technical viability of the wide-area sensor network.

Following the successful pilot, the project will progress to phase one, which will focus on deploying multiple Remote ID sensors across Singapore's southern region. Phase two will cover the northern part of the country, while phase three will encompass the central area. Metropolitan Wireless

International, a telecom company, is collaborating on the project.

Drone Defence Services will combine ground-based infrastructure with its cloud-based airspace monitoring system, AeroTracker, to display any noticeable drone activity to authorized personnel. To ensure the accuracy of the Remote ID sensors, the company will leverage its FAA-approved real-time drone transponder, AeroPing.

Richard Gill, CEO and founder of Drone Defence, highlights the extensive coverage provided by the AeroSentry Zero sensor network, which spans the city-state's 720 sq km area. Gill explains that the Remote ID network will not only identify and track conspicuous drones but also offer data and analytics for Unmanned Aircraft Traffic

Management (UTM) systems. This data will provide insights into drone flight paths, trends, and areas to avoid for flight corridors.

Gill also suggests that services like FoodPanda's "PANDAFLY" could utilize this data for inter-island food drone deliveries, which are currently being trialed. Singapore maintains a strict stance on drone intrusions. Recently, a Chinese student was fined \$3,500 for taking drone photos of his girlfriend at Nanyang Technological University. In a separate incident last year, a Singaporean man received a hefty fine of \$37,000 for illegally flying a DJI Mavic 2 Zoom near a military airbase. The implementation of the wide-area Remote ID network aims to enhance airspace security and mitigate such unauthorized drone activities.

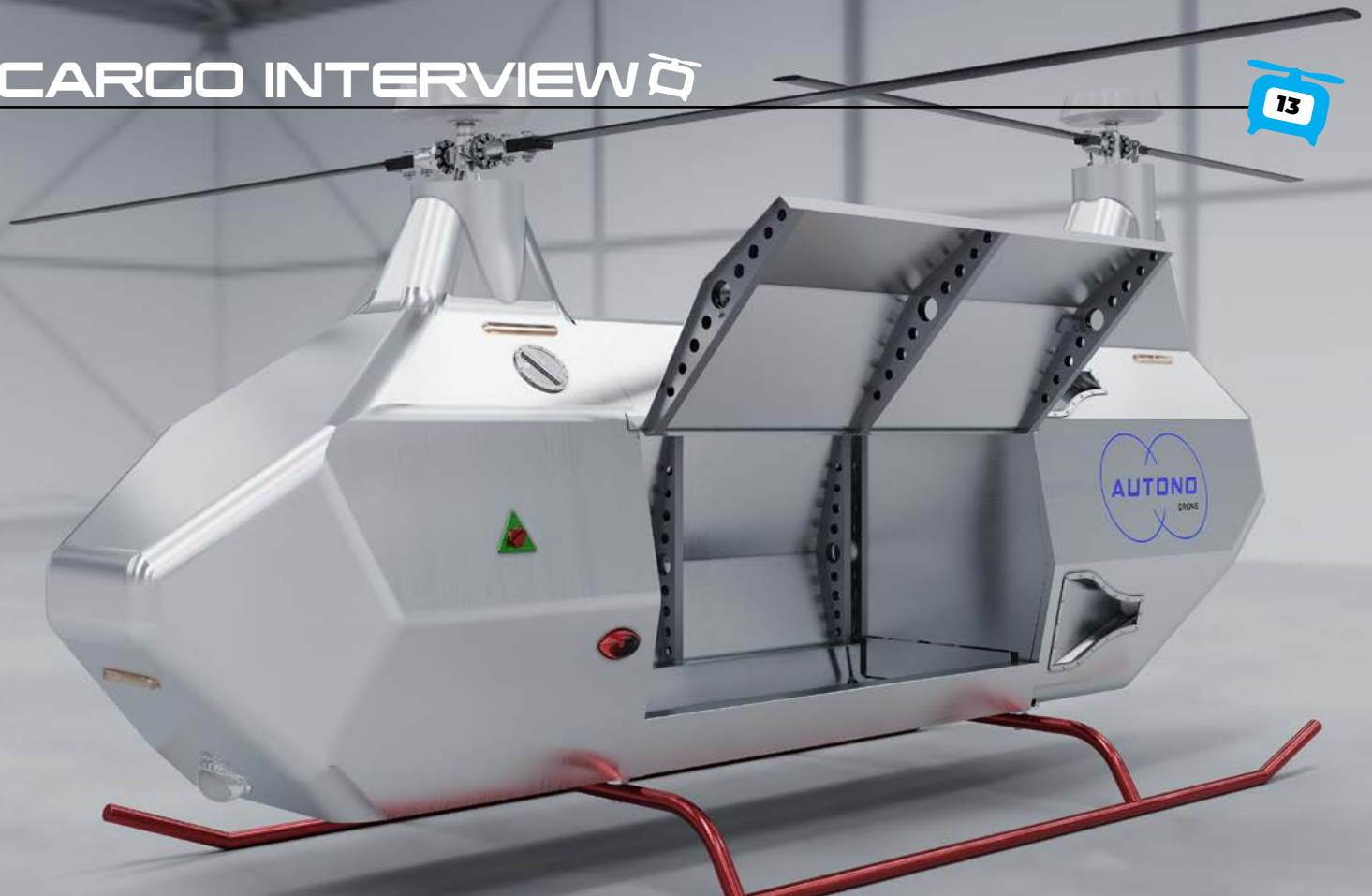


Drones World Editor  
Kartikeya In conversation with

**Mr. Bill Velkovski**

Co-Founder & CEO,  
Autono Drone





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

**A** The Chief Technical Officer, Rod Turner served a 5-year apprenticeship in Mechanical / Electrical engineering at the Royal Aircraft Establishment, a UK based Ministry of Defence, Aerospace research and development facility. Rod has built a reputation working on many challenging projects including a Gyrocopter via the Chamber of Commerce Western Australia, Drone shark detection for the World Surfing League and Rio Tinto's Autonomous train project to name a few. Rod has completed well over a 100 Product designs for companies like the ABC, Alcoa, BHP, Eurosport, Honeywell, Panasonic, NTL and multiple "Startup technology companies".

As the CEO, I have an Electrical Engineering degree from UOW and MBA from MGSM with a

depth of Engineering, Logistics and Manufacturing experience in food and beverage for Coca Cola, Fosters Group, HVCCC and start up technologies geared for commercial mass manufacture.

**Q** What are the various products currently Autono Drone has in offer currently?

**A** Autono Drone is an Australian Technology company based in Perth, developing, and manufacturing heavy payload Autonomous, Vertical Take off and Landing (VTOL) and Beyond Visual Line of Sight (BVLOS) cargo drones (Patent Pending). Autono Drone has focussed on providing an efficient solution for the middle and last mile logistics challenge.

Specifically, Autono Drone is building a family of scalable cargo drones starting with the A200 that is designed to carry 200kg (440 pounds) directly in the hull or in a compact cargo pod for a range of

up to 780km (484 miles) and can land/take off from a small footprint using GPS co-ordinates. The unique scalable design gives Autono Drone the ability to scale and increase payloads from initially 200kg to 500kg, 1,000kg and 2,500kg.

The A200 range utilises a Rotax engine that can operate on new carbon neutral synthetic fuels that are coming to market noting Autono Drone is a designated Rotax original equipment manufacturer.

**The A200 series includes :** The A200-CP (Cargo Pod) model which features convenient cargo pods with detachable lid that can be refrigerated and are available with castors or forklift access points, providing logistics customers with a ready-made, off-the-shelf mobile solution that can easily integrate into existing logistics systems and processes. The automated, easy-to-load-unload cargo pods, ensure secure and efficient deliveries without the need for manual

intervention by humans.

The A200 Standard model has an empty cargo hull for manual loading and unloading which provides for greater volume and payload capacity of 225kg.

The A200-LR (Long Range) model has additional underfloor fuel tanks which provides a much longer range of 780km.

The A200-OF (Open Frame) model has no cargo doors or belly is designed to carry an increased payload of 250kg and is a customisable platform for applications such as cargo net operations, pilotless firefighting crop spraying and seeding.

The A200-CS (Crop Spray) model is designed to have componentry for Autonomous crop spraying fitted. A significant issue for the agriculture industry is soil compaction, Autono Drone plans to find an appropriate partner to develop this technology including AI assisted crop spray target identification. Further, the opportunity exists to partner and develop crop seeding capability. In both cases this give farmers the ability to create crop maps of their fields and deploy the A200-CS autonomously without the need for pilots or the negative effects of soil compaction.

**Q Can you elaborate on the technologies that you are working on and industries you would like to serve?**

**A** Cargo Drone technology is the way of the future for logistics applications. The A200 is designed to be completely autonomous, meaning the A200 can take off vertically, fly a designated flight route and land vertically on a small footprint without the need for a pilot, runway, or other infrastructure, however, if required, can be piloted



remotely at any stage of flight. The autonomous BVLOS capability coupled with an efficient VTOL design provides Autono Drone's customers with a suite of versatile applications including,

- Middle and last-mile logistics
- Urgent spare parts for remote sites like farms, mine, and drill sites
- Transportation of refrigerated good such as pharmaceuticals
- Crop spraying and seeding to avoid soil compaction
- Transporting high-value goods
- Aerial firefighting
- Emergency response including disaster and humanitarian relief

**Q What are some of the important points to be noted based on your observations on the cargo Drone industry, more specific to BVLOS Operations?**

**A** Logistics companies have a real need for autonomous, heavy payload and long-range cargo drones now and into the future. It is not just about companies like Autono Drone developing and manufacturing

Cargo Drones with significant scale specifications including autonomous BVLOS capability, it is also about the various regulatory bodies, Logistics companies and UAV manufacturers working together to produce a cohesive and internationally workable system that allows this segment of the Logistics Industry to grow in a safe manner that ultimately becomes a benefit to humanity.

**Q UAVs in general are either fixed wings or multi rotors. Is there any specific reason for choosing the helicopter over the other designs?**

**A** Before Autono Drone was formed as a company we spent 5 years researching the cargo drone market and had concluded that existing battery technology (energy storage density) made it very difficult to be able to carry heavy payloads of 200kg+ over long distances 480km+. We understand that potential logistic customers need and want a robust solution now that can easily integrate into existing supply chains. A key criterion was VTOL capability, so it became a design exercise in how to satisfy all those criteria using an internal combustion engine. We ended with 3 or 4 concepts, but the



tandem rotor was the logical choice because,

- efficiency of design – two key aspects when creating our design was a versatile and robust utility of application for our potential customers and secondly, ease of mass manufacturing at best cost.
- scalability – we can easily scale our design to 500kg, 1,000kg and 2,500kg.
- No need for charging stations. Fuel can be carried as part of the payload to refuel for next trip at remote destinations.
- Rotax engines can operate on emerging carbon neutral synthetic fuels such as Zero Petroleum.
- No fixed wing means a small landing and takeoff footprint.
- Speed to market vs prolonged R&D project.

**Q As a Co-Founder & CEO, what are your plans for the expansion of Autono Drone both in terms of products and the business?**

**A** We are focussed on moving to commercialise rapidly, the beauty of Autono Drone's design DNA is the ease of rapid mass manufacture and deployment of manufacturing capability globally to meet an expected increase in demand for our Cargo Drone solutions. Autono Drone is targeting test flights of the A200 prototype in Q1 2024 and manufacturing Q4 2024 at a maximum rate of 5 x A200 units per week on a 5 days 8-hour shift basis at its planned manufacturing facility in Perth, Australia. The finished A200 Drones are easily transported by conventional containers, in numbers, or can be transported as single units in a large van or truck. Further, we expect to finalise the A500 design in 2024 with

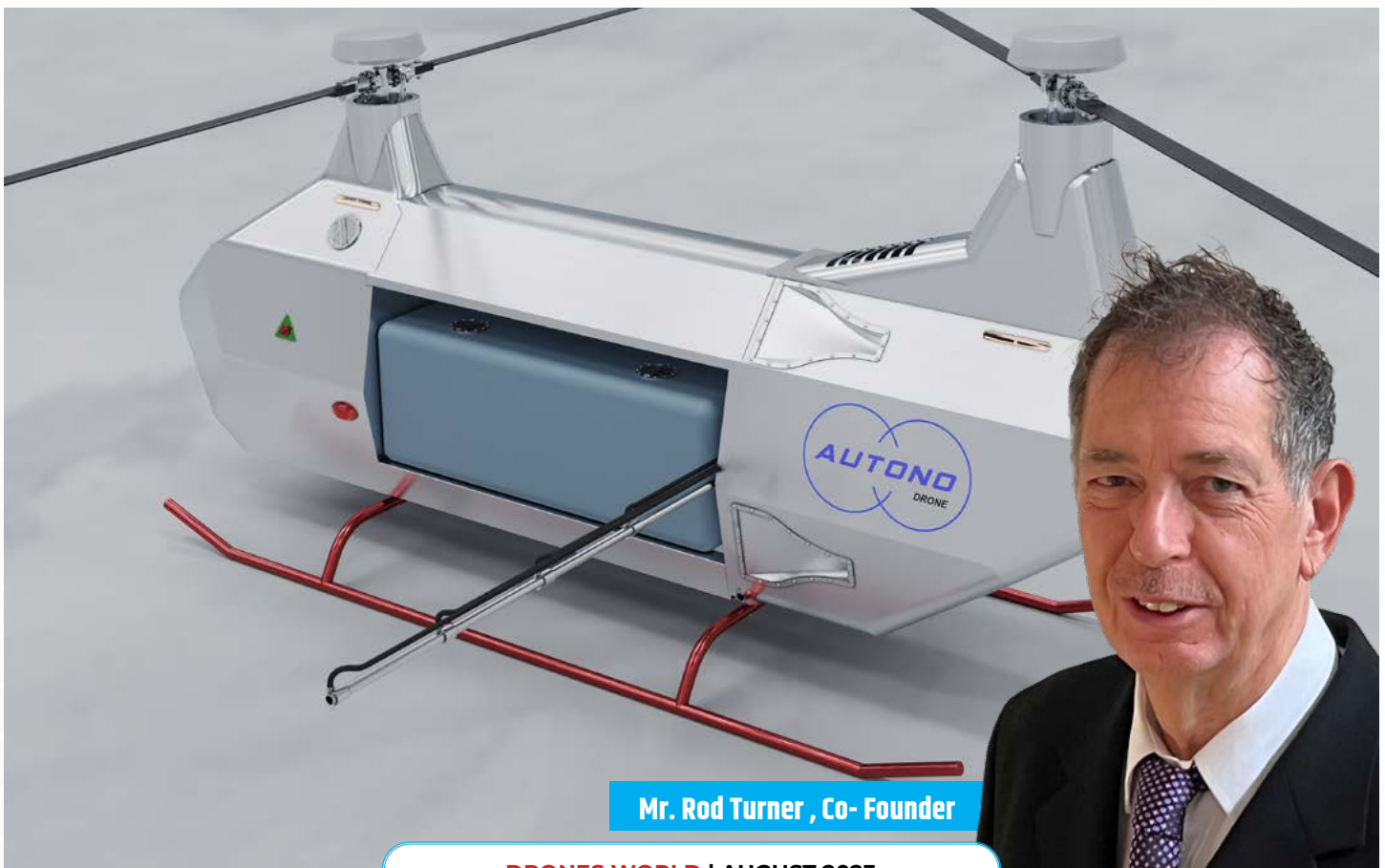
first production in 2025 with the A1000 design completion in 2025 and first production in 2026.

As we build out our product range and business, we can then focus on best available fuel/energy and propulsion systems such as hybrid or pure electric designs as battery technology progresses.

**Q What are the current investing opportunities available with Autono Drones & what is the process to associate with you?**

**A** We are inviting enquiries for a post seed offering. The best way to contact us is to visit our website <https://autono-drone.com> and use our contact form. We are also open to customer and partnering enquiries.

**Email: [bill@autonodrone.com.au](mailto:bill@autonodrone.com.au)  
Phone: +61 409 143 004**



**Mr. Rod Turner , Co- Founder**



## MightyFly to make public autonomous flight demonstrations in 2024

**M**ightyFly was awarded a \$150,000 grant from the Michigan Mobility Funding Platform (MMFP), on May 30th, 2023, to perform autonomous cargo delivery flight demonstrations in the state of Michigan. This is expected to be the first public demonstration of an autonomous, fixed-wing electric vertical take-off and landing (eVTOL) aircraft showcasing 100 pounds of cargo deliveries.

During these demonstration flights, conducted with the support of the Michigan Office of Future Mobility and Electrification (OFME), MightyFly will showcase the capabilities of its third-generation autonomous cargo aircraft with 100 pounds of cargo capacity and a 6 ft by 19 inch by 18 inch cargo bay, capable of carrying up to 212 small USPS packages. MightyFly's express delivery solutions will bring new logistics opportunities to businesses and set a precedent in the world's aviation and logistics industries.

The logistics needs of Michigan's manufacturing, automotive, logistics, retail, chemical and pharmaceutical industries offer the ideal scenario for MightyFly to demonstrate a new way to ship products, parts, supplies and various goods. These Michigan businesses need express logistics, with fast, efficient and affordable same-day shipping services. MightyFly's one-shot business-to-business (B2B) delivery services will provide cost savings for just-in-time manufacturing lines, timely deliveries of crucial shipments for medical treatments, and quick replacements of fast-moving consumer goods to retailers, among many other benefits. The MMFP grant program is managed by the OFME and is part of a statewide strategy to ensure Michigan remains the global leader in the future of mobility. The program was launched by the Michigan Economic Development Corporation (MEDC) and the Michigan Department of Transportation (MDOT) to catalyze and scale new mobility solutions that improve environmental sustainability by encouraging EV adoption and charging infrastructure buildout, increasing access to affordable and reliable transportation options and modernizing existing transportation systems for Michiganders. The OFME has previously partnered with the Michigan Unmanned Aerial Systems Consortium (MUASC) to facilitate testing of autonomous aircraft in Michigan. The OFME works across state government, regulators, academia and private industry to build a robust ecosystem of partners capable of leading the adoption and use of transformative mobility solutions like that of MightyFly.

"We know the future of mobility is more than just vehicles – it is on air, land and sea," said Charlie Tyson, Technology Activation Manager, OFME. "Michigan is uniquely positioned to support testing, development, and deployment of new technologies that will lead to more affordable, accessible transportation solutions and we are excited to support MightyFly through the MMFP program and their continued efforts to grow in Michigan."

"We are excited to be the first large, autonomous, fixed-wing eVTOL cargo delivery company to demonstrate how autonomous aerial expedited logistics solutions will better serve Michiganders," said Manal Habib, CEO of MightyFly. "This demonstration will be the first stepping stone for the efficient flow of goods across the world, making it possible for everyone to access reliable and affordable same-day deliveries. We will be making history!"

In addition to this project, MightyFly is currently scoping and planning proof of concept (POCs) trials with partners throughout 2024 and 2025.

## Dronamics Becomes the World's 1st Cargo Drone Airline with IATA and ICAO Designator Codes



**D**ronamics, the world's first cargo drone airline with a license to operate in Europe, announced it has been officially assigned both IATA and ICAO designator codes. Dronamics is the first cargo drone airline to secure these codes, granting it recognition on par with other international airlines.

Dronamics has been assigned the IATA designator code "OY," along with the accounting prefix "651." IATA codes play a critical role in the aviation industry, serving as essential identifiers for airlines, their destinations, and cargo documents. These codes enable Dronamics to be officially recognized as an airline entity, supporting commercial interline agreements with other IATA carriers, facilitating connections with freight forwarders, and enabling the publication of flight schedules through OAG, the world's leading provider of digital flight information. The IATA 2-letter Airline Designator code "OY" will be used to establish flight numbers for both scheduled and non-scheduled flights, providing standardized identification across its operations. Additionally, the Airline Accounting Prefix "651" grants Dronamics the ability to issue Air Waybills (AWBs), facilitating seamless cargo uplift within its extensive network.

In addition to the IATA codes, Dronamics has also secured the ICAO designator codes, further solidifying its presence in the global aviation community. The ICAO telephony call sign "Black Swan" and the 3-letter airline designator "DXE" have been assigned to Dronamics. These ICAO codes are widely utilized by pilots and air traffic controllers worldwide, playing a crucial role in flight planning, communication with air traffic control, and the dissemination of vital information through NOTAMs (Notice to Air Missions).

"Becoming the first cargo drone airline with both IATA and ICAO designator codes is a testament to Dronamics' pioneering spirit and our vision for faster, cheaper and green air cargo for everyone, everywhere. This recognition by the leading aviation community reinforces our position on the international aviation map," Svilen Rangelov, co-Founder and CEO of Dronamics.

By securing the IATA and ICAO designator codes, Dronamics has solidified its position as the world's first cargo drone airline. This reinforces Dronamics' commitment to innovating air cargo with its drone technology and opens up new avenues for collaboration, growth, and integration within the global aviation ecosystem.



Drones World  
Special Editor Dr.  
Pranay Kumar in  
Conversation with

**Mr. Agnishwar  
Jayaprakash**  
Founder and CEO,  
Garuda Aerospace



**Q** What is your opinion on the recent National Geospatial Policy 2022? What are the new opportunities that will be open for the drone and GIS industry?

**A** The National Geospatial Policy 2022, recently introduced in India, has significant implications for the drone industry. With clear guidelines and standardization, drone operators understand their roles and responsibilities in geospatial data collection, fostering growth for the environment. The policy opens up new opportunities for drones in sectors like agriculture, urban planning, infrastructure development, disaster management and environmental monitoring. Drones enhance surveying, mapping, and infrastructure projects while contributing to environmental conservation and emergency response efforts. Geospatial data collected by drones can be

analyzed with AI and data analytics for valuable insights. Overall, the policy creates business opportunities and jobs, but successful implementation will depend on effective execution, collaboration, and technological adaptation. There is a need for employment in the drone sector and thus this will create entrepreneurs in rural India.

**Q** What are the key technologies/solutions provided by Garuda Aerospace for the Drone industry?

**A** Drones are increasingly being utilized in various industries such as agriculture, construction, and logistics offering cost-effective and efficient solutions for tasks like aerial surveying, inspection, mapping, delivery, and data collection. Currently, Garuda Aerospace manufactures 30+ different types of Drones and offer

over 50 types of services such as Precision agriculture spray, industry 4.0 upgradation services, structural damage inspection, warehouse management for Flipkart and Delivery, Seed dropping, Solar panel cleaning, Project monitoring, Drone delivery of medicines for hospitals and drone delivery of packages for Food Tech startup like swiggy are some of the use cases of drones that Garuda Specialise in. Garuda's Kisan Drones in the fields help improve crop yields, reduce costs, and increase efficiency. The Prime Minister of India, Shri Narendra Modi Ji, flagged off 100 Kisan Drones in 100 Villages in India, and Mahendra Singh Dhoni became the Brand Ambassador, Garuda Aerospace started scaling to new heights.

**Q** What are some of the challenges that Garuda Aerospace faces and how are you planning to overcome them?





**A** The only challenge Garuda Aerospace faced was the willingness of foreign tech giants to cement OEM partnerships with Indian Drone Startups and bridge the technology divide. It was essential for our company to keep evolving and constantly innovating. Additionally, the drone industry was grappling with challenges related to demand and supply. The demand for drones outweighed the supply, and this put drone companies at a crossroads when it came to hiring. Furthermore, the Agri-drone industry faced several challenges, particularly the lack of appropriate transport and mobility

facilities for drones across different farms in villages. There was also a scarcity of skills related to drone operation and handling, making it difficult for companies to find qualified personnel. Moreover, the main challenge farmers faced in the agriculture industry was a lack of knowledge about technology and drones, hindering the adoption of drone technology for agricultural purposes. Garuda Aerospace has successfully resolved these challenges and has overcome them.

**Q** What are the recent innovations of Garuda Aerospace in India and

## Worldwide?

**A** Garuda Aerospace is built on innovation. Most of our drones are loaded with AI and ML making them intuitive and adaptive. Garuda Kisan Drones have proved to have a positive impact in farming. Garuda Aerospace has launched multiple types of drones. Its Kisan drone is the most innovative solution as it reduces manual Labour, saves time and efforts. Recently Garuda Aerospace demonstrated its revolutionary new VAYU drone. This mapping and surveying drone features a payload capacity of 1.5 kg and a maximum take-off weight of 13.5 kg. Its high-resolution 20 MP camera provides exceptional clarity and precision for the capture of detailed images and data in mapping and surveying missions. The VAYU drone boasts a range of 150 km and a flying speed of 27 m/s. The company unveiled the drone at an event in Paris. Earlier this year, Garuda Aerospace also participated in World Economic Forum 2023 to unveil the first-ever carbon-neutral drone at the Indian Sustainability Lounge, Davos.

**Q** What are the opportunities/ advice for young entrepreneurs and startups who want to associate with you?

**A** Garuda Aerospace welcomes young entrepreneurs and startups who are passionate about drone technology and its potential to revolutionize various industries. As a leading player in the drone industry, we offer exciting opportunities for collaboration and partnership. We advise young entrepreneurs to focus on innovative solutions and cutting-edge technology that can complement and enhance our existing offerings. By leveraging our expertise and resources, startups can accelerate their growth and

access a wider market. We encourage startups to approach us with ideas and proposals that align with our vision of creating a sustainable and impactful drone ecosystem. Together, we can shape the future of the drone industry and create lasting value for our customers and society.

**Q** Can you brief us on the advantages of using GIS, IoT, AI & ML and drone technology compared to old methods? At present or in near future do you have any specific requirement of GIS, IT, AI-ML & drones?

**A** Using GIS (Geographic Information System), IoT (Internet of Things), AI (Artificial Intelligence), ML (Machine Learning), and drone technology offer significant advantages compared to traditional methods in various industries and applications. GIS enables spatial analysis, mapping, and real-time updates for better decision-making, while IoT provides data collection and automation for improved efficiency. AI and ML processes vast data, offering predictive analytics and automation, and drones enable aerial data capture, inspection, and surveillance quickly and safely. As a drone services and solutions company, Garuda Aerospace requires the above solutions. Garuda Aerospace drones are equipped with AI and ML technology solutions. Garuda Kisan Drones are loaded with AI and ML (AI is powered by Amazon Web Services, ML is powered by Cognizant) developed to spray 25-30 acres per day and is customizable for a variety of different payloads.

**Q** Any specialized Geo-spatial or drone or photogrammetry or lidar application software training course design and develop for



**new startup companies?**

**A** Garuda Aerospace offers specialized Geo-spatial, drone, photogrammetry, and LiDAR application software training courses designed to cater to the needs of new startup companies in the drone industry. These training courses are tailored to provide in-depth knowledge and hands-on experience in using specific software tools and technologies relevant to Geo-spatial data processing, drone operations, photogrammetric mapping, and LiDAR data analysis. The courses cover topics such as data acquisition, data processing, image

stitching, 3D modeling, point cloud analysis, and GIS integration. The training is conducted by industry experts with extensive experience in the field, ensuring that startup companies gain practical skills and expertise to leverage these advanced technologies effectively in their operations. Garuda Aerospace's training programs aim to empower new startups with the necessary skills and knowledge to excel in the rapidly evolving Geo-spatial and drone industry. The company aims to empower

**Q** How is Garuda Aerospace working towards creating a sustainable future? And is





### **Garuda Aerospace able to manage a successful outreach strategy?**

**A** Garuda Aerospace is committed to creating a sustainable future through various initiatives. They focus on promoting drone technology for precision agriculture, which helps optimize resource usage, reduce wastage, and improve farming practices, leading to more sustainable agriculture. Additionally, their drone-based solutions for industries like logistics and energy contribute to efficient operations, reducing carbon footprints and minimizing environmental impact. Garuda Aerospace also strives to contribute to skill development and job creation by training drone pilots and empowering youth with technological expertise. In terms of outreach strategy, Garuda Aerospace has been successful in establishing a strong presence in the drone industry. Their collaborations with global giants, strategic partnerships, and extensive drone fleet have enabled them to reach diverse markets. They have made significant progress in scaling up their

business and gaining recognition for their innovative solutions. Moreover, their participation in government tenders and partnerships with organizations like NDRF demonstrate their effective outreach and impact in various sectors. Garuda Aerospace is India's first drone startup to receive both, Type Certification and RTPO approvals by DGCA for our indigenously designed Kisan Drones.

### **Q Finally, what is your perception of Indian Drone Industry? What are your suggestions for upcoming Start-ups?**

**A** Garuda Aerospace views the Indian Drone Industry as highly promising and dynamic, with significant growth potential. The industry has witnessed increasing adoption in various sectors, including agriculture, logistics, infrastructure, and defense. As a leading player in the industry, Garuda Aerospace recognizes the importance of innovation, regulatory compliance, and strategic partnerships to stay

ahead in this competitive landscape. For upcoming startups, our suggestions would be to focus on cutting-edge technology, customer-centric solutions, and sustainable practices. Embracing emerging trends like AI, ML, IoT, and automation while investing in talent development and continuous research and development will help startups thrive in the Indian Drone Industry and contribute to its success. In this evolving landscape, the rising popularity of the drone industry and recent IPOs are positive indicators of its growth trajectory. Garuda Aerospace is well-positioned to capitalize on these opportunities with innovative solutions, large drone fleet, and strategic partnerships. As the industry gains traction, we believe startups should focus on differentiation through technology and customer-centric approaches while adhering to regulatory guidelines. By embracing sustainability and investing in talent and R&D, startups can carve a niche for themselves and drive the Indian Drone Industry forward into a promising future. Garuda Aerospace aims to be a unicorn startup by 2025.

### **Q Can you share with us your journey from the Start, What is the story behind Garuda Aerospace?**

**A** An alumnus of the Harvard Business School and serving under the UN Assistant Secretary General- Madam Lakshmi Puri, Agnishwar was preparing many impact reports on the power of youth and emerging technology. He always wondered how impactful the unison would be especially in a developing country like India. India is home to the largest youth population in the world and is a huge chance for potential drone technology to be leveraged. This

powerful combination could be used to disrupt multibillion-dollar sectors at once and that moment led to the building of Garuda Aerospace. Garuda Aerospace was founded in 2015 and now has grown to over a 200+ team.

**Q What is the key differentiator between Garuda Aerospace and the other Leaders of the Drone industry?**

**A** Garuda Aerospace has established itself as a prominent player in the drone industry with several key differentiators setting them apart from other leaders in the field. Their primary distinction lay in their advanced drone technology, incorporating innovative features such as improved flight stability, extended flight times, and cutting-edge data processing capabilities. Moreover, Garuda Aerospace focused on providing customized solutions for various industries, catering to specific needs in sectors like agriculture, surveying, and public safety. The company's global reach and international presence further distinguished them, as they undertook projects and served clients on a worldwide scale with Lockheed Martin, Cognizant, Elbit Systems etc. Committed to research and development, Garuda continuously pursued technological advancements, staying ahead of competitors and delivering superior drone solutions. Notably, their strong emphasis on customer support, comprehensive training programs, and exceptional after-sales services enhanced the overall customer experience, contributing to their reputation as a leader in the drone industry.

**Q What is your take on the Recent IPO's and the Rising popularity of the drone Industry?**

**A** Garuda Aerospace views the

recent IPOs in the drone industry as a positive sign of the rising popularity and growth potential of the sector. The increasing number of companies going public indicates the confidence of investors in the drone industry's future prospects. The IPOs also provide validation to the market and attract more attention and investments, which can further fuel innovation and expansion within the industry. The rising popularity of drones across various sectors, including agriculture, logistics, construction, and defense, presents immense opportunities for companies like Garuda Aerospace to scale up and create a significant impact. Garuda Aerospace is well-positioned to capitalize on the rising popularity of the drone industry with its innovative solutions, large drone fleet, and strategic partnerships. The company's strong foothold in the market and its commitment to cutting-edge technology and quality services make it well-equipped to take advantage of the growing opportunities in the drone industry and contribute to its continued success. Garuda Aerospace aims to go public by 2025. The company will soon become India's first ever Drone Unicorn Startup.

**Q As a drone logistics player, what is your goal for the next 5 years?**

**A** Garuda Aerospace stands as India's leading drone manufacturing company, disrupting two significant multi-billion dollar sectors: Precision Agri Tech and Industry 4.0 upgradation. Their primary focus lies in building advanced drone solutions for the agriculture and defence industries, with an asset-light, recession-proof, and agnostic approach. Specializing in the design, construction, and customization of

Unmanned Aerial Vehicles (UAVs) or Drones, Garuda Aerospace prioritizes not only delivering high-quality services but also promoting safety, security, and compliance within the drone industry. As the usage of drones is expected to grow substantially in the near future, they are poised to play a critical role in delivering medicines and goods to rural and inaccessible areas during emergencies. In urban settings, these drones serve as vital carriers of emergency supplies during calamities. Garuda Aerospace's drones have already proven their significance in disaster management and emergency situations in the past year. The company envisions equipping drones with advanced features such as facial recognition software, temperature control, and sturdy payload delivery boxes to ensure the safe transport of packages while avoiding obstacles. While current drones can carry around 15-20 kgs of goods, ongoing technological developments are expected to enable much higher payload capacities. Garuda Aerospace has already demonstrated its commitment to social impact by deploying drones for rescue and relief operations during various crises, including the Chamoli glacier burst in Uttarakhand, locust control in Rajasthan, and support for flood situations in Gujarat and Andhra Pradesh. Their continued dedication to deploying drones for various medical scenarios has created a significant positive impact. With their relentless pursuit of technological advancements and their focus on critical sectors like agriculture and defence, Garuda Aerospace remains at the forefront of India's drone industry, poised to contribute significantly to the nation's development and humanitarian efforts.



# NASA and uAvionix Deploy SkyLine Command and Control Services at AAM Test Range



**N**ASA and uAvionix have signed a Space Act Agreement to develop advanced Beyond Visual Line of Sight (BVLOS) Command and Control (C2) technologies for Unmanned Aerial Systems (UAS) in urban environments. Under the agreement, NASA will work with uAvionix to conduct research & development of commercial UAS C2 systems utilizing internet-based infrastructure and air traffic control frequencies.

NASA researchers will conduct flight testing at the UAS Flight Test Range at NASA's Langley Research Center in Hampton, Virginia. Flight data will be generated and evaluated on the uAvionix SkyLine C2 technology under the High Density Vertiplex (HDV) project.

"The HDV project is excited to partner with uAvionix to support the Advanced Air Mobility (AAM) mission," said Jacob Schaefer, HDV Technical Lead. "C2 technologies are critical to achieve the advanced flight operations envisioned within future of AAM."

This partnership, and the associated technical work, is a great example of how NASA is working with industry to drive technology and innovation through the aviation industry. This partnership will significantly contribute support to the development of remotely piloted commercial passenger flight operations that rely on the performance of certified Control and Non-Payload Communications (CNPC) link systems.

"uAvionix is proud to partner with NASA on this important project," said Christian Ramsey, uAvionix Managing Director. "NASA's collaboration will help advance the operational application of our skyLink5060 radios, an important step to facilitate AAM, especially passenger carrying vehicles and vertiports that will ultimately require certification."

The performance and operational standards are currently being tested by several manufacturers and operators with use cases ranging from Urban Air Mobility to long range cargo delivery. Flight tests are planned between the summer of 2023 and summer of 2024 and will include technologies enabling advanced BVLOS operations.



## Teledyne FLIR Defense Awarded Contract to Supply 1,000 More Black Hornet Nano-Drones to Ukraine

**T**eledyne FLIR Defense, part of Teledyne Technologies Incorporated), will produce Black Hornet® 3 Personal Reconnaissance Systems for use in Ukraine as part of an order from Norway's Ministry of Defense.

The Norwegian MOD will procure an additional 1,000 Black Hornet unmanned aerial systems (UAS), as well as spare parts, maintenance, and training for Ukrainian operators and instructors. Last August, Norway donated nearly 300 Black Hornet systems to Ukraine forces through the UK-led International Fund for Ukraine.

"Ukraine is very satisfied with previous Norwegian deliveries of this type of reconnaissance drone," Norwegian Defense Minister Bjørn Arild Gram said in a statement.

The award-winning Black Hornet 3 is designed and built by Teledyne FLIR in Norway. The pocket-sized UAV weighs just 33 grams (less than 0.1 pounds) and measures 168 millimeters (less than seven inches). Well suited for operations in highly contested and GPS-denied environments, nearly silent, and with a flight time up to 25 minutes, the Black Hornet transmits live visible and thermal video to the user.

"We are honored and proud to support Norway's efforts to assist forces in Ukraine," said Dr. JihFen Lei, executive vice president and general manager of Teledyne FLIR Defense. "The Black Hornet has proven to be game-changing technology that can help soldiers perform missions more safely and effectively."

Black Hornet drones are currently being used by Ukrainian forces through donations made last summer by the Norwegian and British governments. They have performed successfully in numerous operations under the harshest of environments. FLIR Defense has delivered more than 14,000 Black Hornet PRS systems to military and security forces in over 40 countries. The U.S. Army has placed Black Hornet orders worth more than \$140 million over the past five years, including in support of its Soldier Borne Sensor program.

## BAE and ELTA Systems successfully test manned-unmanned teaming requirements on ACV



**B**AE Systems has successfully tested manned-unmanned teaming (MUM-T) on the Amphibious Combat Vehicle (ACV) C4UAS as a technology demonstration using IAI/ELTA Systems Ltd's Rex MK II Unmanned Infantry Combat Support System. The teaming technology enhances mission effectiveness through greater situational awareness and decision making capabilities.

The successful demonstration of MUM-T capabilities shows the versatility of the built-in growth capacity in the ACV C4UAS. The ability to incorporate MUM-T into mission planning expands mission parameters and tactical sphere while decreasing the risk to human and technological assets in uncertain or hostile environments.

"This is an exciting next chapter to show the growth potential of the ACV C4UAS," said Garrett Lacaille, vice president of the Amphibious Vehicles product line for BAE Systems. "Pairing an unmanned system like the Rex provides increased situational awareness, supports mission success, and reduces the risk to our Marines."

The ACV is an adaptable amphibious platform built to meet the operational needs of the Marine Corps, allowing space for new capabilities as technology evolves such as reconnaissance, electronic warfare, anti-air, and uncrewed aerial systems (UAS) systems integration. Built in partnership with Iveco Defence Vehicles, the ACV is a unique mix of true open-ocean amphibious capability, land mobility, survivability, payload, and growth potential.

The Rex MK II system is an unmanned autonomous vehicle that provides direct support to maneuvering infantry units. It can perform a variety of tasks including tactical logistic support, tactical intelligence, surveillance, and reconnaissance (ISR), operating lethal weapons through target acquisition and evacuating wounded Marines.





## PHASA-35 Completes 1st Successful Stratospheric Flight

**B**ritish engineers have successfully completed a stratospheric flight trial of BAE Systems' High Altitude Pseudo Satellite (HAPS) Uncrewed Aerial System (UAS) - PHASA-35. Over a 24-hour period, PHASA-35 soared to more than 66,000 feet, reaching the stratosphere, before landing successfully. The trial, completed last month in New Mexico in the USA, allowed engineers to assess the performance of the experimental solar-electric drone within the outer-reaches of the planet's atmosphere.

The flight marks a significant milestone in PHASA-35's development which began in 2018. Designed by BAE Systems' subsidiary Prismatic Ltd to operate above the weather and conventional air traffic, it has the potential to provide a persistent and stable platform for various uses including ultra-long endurance intelligence, surveillance and reconnaissance, as well as security.

It also has the potential to be used in the delivery of communications networks including 4G and 5G and could be used in a wide range of applications, such as disaster relief and border protection, as an alternative to traditional airborne and satellite systems. The PHASA-35 programme sits within FalconWorks™, a new centre for advanced and agile research and development within BAE Systems' Air sector, designed to deliver a range of cutting-edge combat air capabilities to the UK and its allies.

PHASA-35, which has a 35-metre wingspan and carries a 15kg payload, uses a range of world-leading technologies including advanced composites, energy management, solar electric cells and photo-voltaic arrays to provide energy during the day which is stored in rechargeable cells to maintain flight overnight.

The successful trial assessed the performance of the experimental system across a range of areas. It is the first in a series of trials planned to confirm system performance, support development activities and validate test points to enable PHASA-35 to be made available in defence and commercial markets internationally.

"This is a fantastic achievement for everyone involved and shows the commitment of BAE Systems to invest in new technologies and markets. PHASA-35's first stratospheric flight demonstrates that this vehicle is on track to become the go-to system for long endurance, high altitude and communications applications in the future. The successful trials are a testament to the hard work of the fantastic team that we have built over the last couple of years within Prismatic and across our partner companies including Piran, Amprius, Microlink, Honeywell, PMW Dynamics and the Met Office. I look forward to the next steps as we develop this unique system." Dave Corfield, CEO of Prismatic Ltd

"PHASA-35 is breaking new ground - opening up the stratosphere to new possibilities. The team, which brings together BAE Systems' know-how from across the globe with innovative solar and power management technologies, demonstrated tremendous commitment and ambition as they tackled the challenges associated with novel technologies and approaches. This partnership approach is key to our ability to enhance our defence expertise with new thinking and technologies." Cliff Robson, Group Managing Director for BAE Systems' Air Sector

## NGC to Design Autonomous Vertical Takeoff and Landing Aircraft for DARPA



**N**orthrop Grumman Corporation has been awarded a contract by the Defense Advanced Research Project Agency's (DARPA) Tactical Technology Office to design an autonomous vertical takeoff and landing (VTOL) uncrewed aircraft system capable of operating from a moving Navy ship at sea.

The Advanced aircraft Infrastructure-Less Launch and Recovery (ANCILLARY) demonstrator will be designed as a cost-efficient, multiple-mission capable vehicle built on an agile platform that is runway independent.

Northrop Grumman's ANCILLARY demonstrator will be capable of carrying a large 60-pound sensor payload with greater endurance of 20 hours' time on station and mission radius range of 100 nautical miles, which is more than current systems, without using significant additional infrastructure aside from what is on board the air vehicle. The system will also have capability to land on a ship in adverse weather conditions.

The aircraft will be capable of performing intelligence, surveillance, reconnaissance and targeting missions, and supporting expeditionary missions for special operations forces and logistical missions with significant affordability impacts for ship-to-shore transition of parts and supplies.

**Expert:** Tim Frei, vice president, research and advanced design, Northrop Grumman: "In collaboration with DARPA, Northrop Grumman will work to significantly enhance how future autonomous vertical lift aircraft will operate at sea and ashore. The ANCILLARY program enables us to combine our digital engineering expertise with extensive knowledge and insights from past successes in developing and operating uncrewed vertical lift aircraft for the U.S. Navy."



## USMC Completes 20,000 Flight Hours with MUX MALE MQ-9A

General Atomics Aeronautical Systems, Inc. (GA-ASI) congratulates the U.S. Marine Corps (USMC) on achieving a significant milestone of surpassing 20,000 flight hours with their Marine Air-Ground Task Force (MAGTF) Unmanned Expeditionary (MUX) Medium-Altitude, High-Endurance (MALE) MQ-9A Unmanned Aircraft System (UAS).

To date, GA-ASI has delivered eight MQ-9A UAS to the USMC. Two of these MQ-9A aircraft are actively engaged in operational missions, playing a vital role in supporting mission-critical Marine Corps objectives. The USMC awaits delivery of 12 additional aircraft, which will fulfill their goal of three squadrons by 2025.

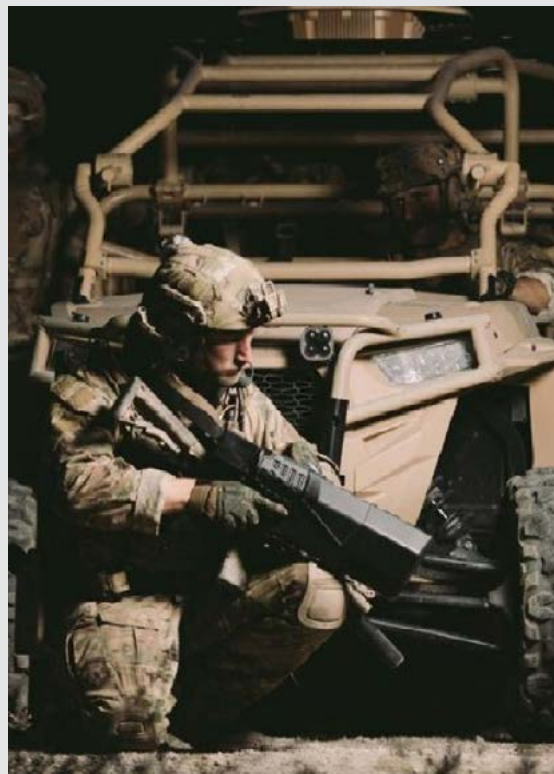
"This strategic acquisition of MQ-9As underscores the USMC's commitment to strengthening their aerial surveillance capabilities and demonstrates their confidence in GA-ASI's expertise in delivering top-tier UAS," said GA-ASI President David R. Alexander.

Renowned for its fault-tolerant flight control system and triple-redundant avionics system architecture, the MQ-9A UAS embodies the industry's highest standards of reliability and performance, surpassing those of many manned aircraft.

The USMC fleet will ultimately be entirely composed of the MQ-9A Extended Range (ER) configuration, enhanced with wing-borne fuel pods and reinforced landing gear. This model has been specifically designed to extend its endurance to more than 30 hours, enabling persistent long-endurance surveillance capabilities. Equipped with Full-Motion Video and both a Synthetic Aperture Radar and a Moving Target Indicator/Maritime Mode Radar, this advanced system provides the USMC with a comprehensive real-time situational awareness picture.

The USMC's 20,000 flight hours with MQ-9A represent an impressive accomplishment in the field of unmanned aviation. GA-ASI is honored to have played a role in this achievement and looks forward to continuing its collaboration with the USMC to further advance the capabilities of unmanned systems and support their growing UAS squadrons.

## DroneShield Awarded Record \$33 Million U.S. Government Contract



DroneShield is pleased to announce it has received a record \$33 million order from a U.S. Government agency. The award consists of DroneShield C-UAS / counterdrone equipment and multi-year services.

DroneShield's U.S. CEO, Matt McCrann, commented: "We're honored to receive this award and support this customer. This award is a result of their trust in DroneShield and our solutions, and reflects our commitment to their mission."

"We're proud of our team's efforts, the increasing value we've delivered to our customers worldwide, and are excited about continuing to support and grow the business as we look towards 2024 and beyond."

The company expects to receive full payment of the order prior to the end of 2023 and anticipates this year to be another record year, by a wide margin, following the previous record year in 2022.

This latest order follows a \$9.9 million order announced earlier this month, from another customer among the Five Eyes community.

DroneShield current order backlog (committed orders in the process of fulfillment) stands at a record \$62 million, with a current pipeline of over \$200 million across more than 80 opportunities.



# Delta Drone Adds Military Drones to its Core Business and Proposes Name Change to Tonner Drones

Following its acquisition of military drone company Tonner Drones, Delta Drone is adding to its core business by including the development and sales of military drones and their associated software and services. In addition, the Company proposes to change its name to Tonner Drones. As a condition to their initial investment announced on 5 June 2023 of € 1.5 million, the new investor group, led by Mr. Diederik van den Ouden, insisted that the former Delta Drone management team be replaced, and that a new management team led by Jean-François Ott and Brad Taylor optimize the management of the company and develop a new vision and strategy. The new management team brings to the Company an extensive network in the corporate, governmental, and financial sectors particularly throughout Europe, North America, and Africa that it fully intends on using to generate shareholder value.

In the first few weeks since arriving, the new management has been focused on (i) reducing the monthly cash burn through the payment plan announced on 27 June 2023 with Yorkville and optimizing operations<sup>1</sup>; (ii) securing the € 1 million shareholder loan with the New Investor as announced on 18 June 2023 that provides the Company with short term operational funds; (iii) terminating variable pricing financing products; and (iv) working with partners and other stakeholders to generate revenues for the company.

Current studies<sup>2</sup> indicate that the global military drone sector has a value of approximately € 12 billion growing to more than € 30 billion by 2030. By adding military drones to its strategy, the Company aims to develop its technology and products to meet this increasing demand. The Company sees significant potential in the Tonner Drones military technology and the technology developed by Delta Drone over more than a decade to increase shareholder value.

At the core of Tonner Drones is modular drone technology with firing capabilities that has been developed for the military



sector since 2018 at a cost of more than € 8 million. In addition to the associated intellectual property, hardware, software, and technology, the company owns the rights to a recoil ejection system patent in Germany as well as pending patents before the World Intellectual Property Organization (WIPO), Europe, Australia, New Zealand, Canada, and the United States. Tonner Drones is still in the process of developing this technology. Of note, while this technology was developed for the military, the modular nature of the technology means that it can also be modified for applications in the security, firefighting (including forest firefighting and prevention), search and rescue (including the delivery of medical necessities), and agricultural planting sectors. While the Company's initial focus will be on the military sector, it will also evaluate and develop products in parallel for these other sectors as needed.

The Tonner Drones military technology is needed most urgently today in the Ukraine and several African nations. Productive discussions have already been taking place with corporate and governmental representatives in these and other regions.

The Company's objective will be to work on site with its customers to study the specific military challenges each is confronting so that we can develop robust, easy-to-operate, and unique tailor-made military drone solutions

for them. By interacting on the ground with the military and security personnel who are charged daily with the responsibility of protecting the lives of their citizens, the Company believes it can best develop drone solutions that will cater properly and specifically to their immediate needs. These solutions are not optimized with "one size fits all" products developed in a research and development facility or warehouse offsite. Each military situation and region are unique; therefore, each product must be unique and developed onsite with the teams confronting these challenges every day.

The Company also has at its disposal the extensive inventory of drones, equipment, charging stations, batteries, software, materials, video and surveillance devices, telescopic cranes, and technology developed over the years by Delta Drone. These items are being evaluated and will be re-tooled and modified to meet the needs of the Company's new strategy.

"We are focused on the future by creating a new company that will build upon more than a decade of technological development and experience at Delta Drone by adding a military drone development component," said Brad Taylor, the new CEO "I am confident that this strategy will open up new markets and clients for the company to generate value for our shareholders and stakeholders."



## Teledyne FLIR Defense Wins \$94M IDIQ Contract from US Army for Black Hornet 3 Nano-Drones

**T**eledyne FLIR Defense, part of Teledyne Technologies Incorporated has won a five-year Indefinite Delivery, Indefinite Quantity (IDIQ) contract worth up to \$93.9 million to provide its Black Hornet® 3 Personal Reconnaissance Systems (PRS) to the United States Army. The initial award under this IDIQ will cover delivery of the nano-unmanned aerial systems (UAS), as well as controllers, spare parts, and training.

In 2018 the U.S. Army began acquiring Black Hornet 3's as part of its Soldier Borne Sensor (SBS) program. Since then, the Army has placed orders totaling more than \$125 million for the multi-faceted drone. Soldiers are using the advanced nano-UAVs to augment squad and small unit surveillance and reconnaissance capabilities.

Weighing just 33 grams, nearly silent, and with a flight time up to 25 minutes, the combat-proven, pocket-sized Black Hornet PRS transmits live video and HD still images back to the operator. Well suited for operations in contested environments, the Black Hornet provides soldiers with immediate covert situational awareness to help them perform missions more safely and effectively.

Black Hornet drones are currently being used by Ukrainian forces through donations made by the British and Norwegian governments. This month, Norway's Ministry of Defense ordered 1,000 more UAS systems. They have performed successfully in numerous operations under the harshest of environments. FLIR Defense has delivered more than 20,000 Black Hornet PRS systems to military and security forces in over 40 countries.

"The Black Hornet 3 gives warfighters up-to-the-minute situational understanding before and while they conduct missions," said Dr. JihFen Lei, executive vice president and general manager of FLIR Defense. "We are proud to provide this unique capability to our soldiers and honored by the U.S. Army's long-term commitment through the new IDIQ, building on its previous orders under the SBS program."

"FLIR Defense will continue to invest in developing unmanned platforms and smart sensors that are proving their worthiness in operational theaters worldwide," Lei added. "These technologies are reshaping the modern battlefield."

The award-winning Black Hornet 3 is designed and built by FLIR Defense in Norway.

## Schiebel Camcopter S-100 Delivers Emission Monitoring and Maritime Surveillance for EMSA in France



**T**he European Maritime Safety Agency (EMSA) contracted Schiebel to support operations with its CAMCOPTER® S-100 for emission monitoring and maritime surveillance purposes in northern France on behalf of the General Directorate of Maritime Affairs, Fishery and Aquaculture (DGAMPA).

Stationed at CROSS Gris-Nez, the CAMCOPTER® S-100 currently supports in emission monitoring and maritime safety, including environmental protection and response, fisheries inspection, Search and Rescue (SAR) as well as control of all relevant vessels passing through the Channel. CROSS Gris-Nez is the Regional Centre for Surveillance and Rescue at Sea and is responsible for the duties of the Maritime Rescue Coordination Centre (MRCC) on the French side of the English Channel.

The S-100 executes these tasks equipped with a Trakka TC-300 EO/IR sensor, an Explicit Mini Sniffer for emission monitoring, a Becker Avionics BD406 Emergency Beacon Locator, an Automatic Identification System (AIS) receiver and a Mode-S Transponder ADSB out.

"This area of sea is one of the busiest shipping lanes in the world, where 24/7 monitoring of all maritime activities is essential. Schiebel's S-100 has supported numerous maritime authorities to date, with EMSA being one of our most prestigious customers," said Hans Georg Schiebel, Chairman of the Schiebel Group.



# Mira Aerospace, A JV of UAVOS and Bayanat, Successfully Completed ApusDuo Solar Aircraft Test Flight



**M**ira Aerospace, a joint venture of UAVOS, a developer and manufacturer of advanced unmanned systems, and Bayanat, a part of the Abu Dhabi-based G42, announced a successful test flight of the ApusDuo solar-powered high-altitude pseudo satellite (HAPS). The flight took place on June 8, 2023 at the Huye aerodrome, the Republic of Rwanda. With all basic aircraft tests for the ApusDuo HAPS now complete, Mira Aerospace will proceed with preparations for stratospheric test flights.

During this test flight the ApusDuo UAS reached altitudes of 16,686 m HMSL (height above mean sea level) and touched down at the departure runway in 10 hours and 30 min after takeoff. The ApusDuo HAPS successfully achieved a scope of test points, including flight stability check and controllability with

a payload of 3,6 kg installed at high altitudes and C2 link performance evaluation (the communications link between a UAV and its ground station).

The UAVOS-designed avionics system demonstrated stable performance in extreme temperatures of minus 68 degrees centigrade. The UAVOS avionics system serves as the brain of the ApusDuo unmanned aircraft ensuring safe Beyond Visual Line of Sight (BVLOS) flight profiles throughout the various phases of lift-off, ascent and landing.

"We're extremely pleased about the successful completion of the next test range," said Vadim Tarasov, Board Member, Mira Aerospace. "Based on our experience and learnings from these tests, we feel there are even greater possibilities for the HAPS business. The Mira Aerospace team will continue to work toward our ultimate goal

of bridging the world's digital divide and revolutionizing mobile connectivity by leveraging the HAPS platform."

The HAPS program was established to fast-track the development and adoption of HAPS technology to support high altitude missions. The missions include providing a wide range of applications in Connectivity, Earth observation, Weather, Security, Natural Resources and Emergency Disaster management.

HAPS refers to systems where unmanned aircraft flying in the stratosphere can be operated like telecommunication base stations to deliver connectivity across wide areas. Since HAPS can provide stable telecommunications networks without being affected by situations on the ground, the technology is also expected to help assist rescue and recovery efforts during times of disasters.

# GA-ASI, CAL FIRE and CA ANG Complete Flight Demo of REAP Pod on MQ-9A



In collaboration with the California Air National Guard (CA ANG), National Guard Bureau (NGB), AT&T FirstNet, California Governor's Office of Emergency Services (OES), and the California Department of Forestry and Fire Protection (CAL FIRE), General Atomics Aeronautical Systems, Inc. (GA-ASI) successfully completed a flight demonstration of the Rosetta Echo Advanced Payloads (REAP) Pod on an MQ-9A Remotely Piloted Aircraft (RPA). During natural disasters, it's fairly common for first responders and residents of affected areas to lose cellular communications due to downed infrastructure. The REAP Pod provides potentially lifesaving communications infrastructure from an aircraft, ensuring lines of communication remain open between providers of emergency services and those desperately needing assistance.

This flight demonstration, held on May

25, 2023, showcased bridged communications networks providing seamless connectivity between airborne and ground participants. The system showcased the ability to bridge VHF/UHF networks, function as a P25 repeater, connect geographically disparate mobile ad hoc networks (MANETs), and most importantly, provide both FirstNet and emergency 911 cellular capabilities. As California heads into its heavy wildfire season, the REAP Pod on CA ANG MQ-9As will provide needed communications to support CAL FIRE's rescue efforts.

"GA-ASI is excited to showcase the capabilities of the REAP Pod," said GA-ASI Vice President of Mission Payloads and Exploitation Satish Krishnan. "The CA ANG MQ-9As with REAP can ensure CAL FIRE and other first responders maintain critical communications infrastructure at a time when it's most urgently needed and can help

save lives."

The REAP Pod was developed through a collaboration between GA-ASI and Ultra Intelligence and Communications. The system features a suite of advanced communications equipment that helps support disaster relief operations, including VHF/UHF Line of Sight (LOS), P25, MANET, FirstNet Cellular, and a high-bandwidth LOS backhaul. The REAP pod also has the ability to support military waveforms like Link 16.

As manufacturer of the REAP Pod, GA-ASI aims to ensure the successful initial deployment of the pod as an operational proof of concept. This deployment serves a larger objective by advancing the implementation and effectiveness of the REAP Pod and setting the stage for potential adoption by the Air National Guard on the MQ-9A and the Army National Guard on MQ-1C Unmanned Aircraft Systems (UAS).



# Aurora Develops Adaptive Control Architecture for Unmanned Surface Vessels



Aurora Flight Sciences, a Boeing company, is developing and testing machine learning-based introspection technologies aimed to enable physical systems, in this case ships, to adapt their control laws as they encounter uncertainties or unexpected events. The work is part of a seedling program titled “Fast Adaptation and Learning for Control Online” (FALCON) to support the Defense Advanced Research Projects Agency’s (DARPA) Learning Introspective Control (LINC) program.

Aurora’s FALCON solution is a platform-agnostic, computationally lightweight online learning and adaptive control architecture that delivers fast convergence for changing nonlinear, nonparametric dynamics in cyber-physical systems. It can detect destabilization quickly and reconstitute control online for safe and continued operation.

In response to changing circumstances, FALCON recalculates safe reachable operating limits in real time while providing guidance and situational awareness to the operator, whether that operator is human or an autonomous controller.

This spring, Aurora implemented their proof-of-concept control architecture on 1.5-meter-long unmanned surface vessels (USV) and began testing in the Charles River in Cambridge, Massachusetts. The USV compensates for the currents and waves, which are large relative to the size of the vehicle. The first program demonstration examines the USV’s ability to reconstitute control after a significant reduction in control effectiveness of one thruster, similar to the disturbance induced by rudder lock in larger vessels.

The program team also includes the Massachusetts Institute of Technology

(MIT) Aerospace Controls Laboratory led by Prof. Jonathan How, and the MIT Marine Autonomy Laboratory (PavLab) led by Dr. Michael Benjamin. The MIT PavLab, located in the MIT Sailing Pavilion on the Charles River, is providing the USVs, which serve as a rapidly adaptable test platform for FALCON.

“The ability to test USVs directly on the Charles River enables a rapid development and test cycle that advances our program efficiently,” said Dr. Max Greene, controls researcher at Aurora. “With these types of resources and collaborations, we can apply the latest methods from the adaptive control, machine learning, and autonomy fields.”

Work on the FALCON program is ongoing, with future demonstrations planned to investigate additional unpredictable disturbances, such as large wind loading and fuel slosh effects.

Drones World  
Editor Kartikeya in  
conversation with

---

**Mr. Matthias  
Gronstedt**  
CEO, HHLA Sky





**Q** How best can you describe the journey of yours since its humble beginnings to where it is now?

**A** Digitalization, mobile robots & AI: The potential of drones in industrial use was obvious to many people years ago. So, we jumped right into the question: What if we scale drone missions for industrial usage? How efficient might be simultaneous operating drones for then? What huge potential could flying robots unleash for humanity? By monitoring and mapping assets and infrastructure in real time - interconnected with AI supported data analysis.

And we found some answers, how to realize it.

At HHLA Sky we developed a process management and drone control platform that maps the entire process chain for safe and secure drone flights. Not only the BVLOS flight control. Our Integrated Control Center (ICC) is a powerful, open and modular industrial IoT platform to support end-to-end processes. The ICC interfaces with drone hardware running our ROS2-based drone operating system.

Via our ICC, organizations can manage and control 100+ automated drones or autonomous mobile robots at different locations - simultaneously.

By the way: Our brand-new X4 drone recently was awarded with the Red Dot Design Award in the highest distinction "Best of the Best". The ICC has been also awarded, already in 2021. This forward-thinking solution has won the prestigious German Innovation Award.

**Q** What are the various products and services that HHLA Sky drones has in offer currently? Could you elaborate its

**specifications, capabilities and the possible modifications?**

**A** We offer drones for different types of governmental and industrial usage. That could be flying, swimming and ground-based drones. They can be actively monitored and controlled BVLOS via our Integrated Control Center, with real-time data transmission to up to 20 clients each, including HD RGB video, infrared video, and other sensor data.

Our award winning X4 drone is geared towards first responders and security professionals, featuring easy deployment, low-noise operations for silent person detection and track-and-trace. Data streams are end-to-end encrypted from the camera sensor to the remote control or control center.

The entire system was tested by the German technical inspection agency TÜV NORD - it's now the world's first cybersecurity certified drone system. The importance of safety and cybersecurity we understand from our customers, who often operate in critical infrastructures, which influenced our system development.

Back to the drones: Our drone lineup includes the X11 multi-purpose hexacopter for automated asset inspections and surveys, and the X25 cargo drone capable of carrying up to 22 pounds with a range of up to 15 miles. An automated docking station will soon be completed for efficient package handling autonomous mobile robots can take over freight delivery from there.

For long-distance missions, we offer a VTOL, as this design increases range and speed. Our VTOL provides up to 136 miles range and 68 mph maximum speed. It's suitable for delivery, surveys or linear infrastructure inspections.

With these drones and a scalable

system, we can cater to a wide variety of use cases

**Q** What is your opinion on U-Space? What are the complications in implementing fully? What are the supports required from the drone industry to make it successful?

**A** U-spaces, the European flavour of UTM, really can boost drone usage through automation - and we are actively working to make it a reality. Together with commercial and research partners across Europe we have developed and keep refining the tools and processes needed for U-spaces which support a safe co-existence of many drones, along with automated management of flight plans.

In urban areas, the lower airspace is already highly frequented by starting and landing planes, police and rescue helicopters and soon by many commercial drones. So, secure systems are needed to ensure safe separation and deconfliction. Projects like Genius, UDVeO, and LUV, and others which we are or have been involved, are necessary to gain the insights needed to create fair and efficient access to airspace. We do this in close dialogue with EASA, the German Federal Ministry for Digital and Transport, as well as other CAAs and stakeholders in this developing eco-system.

A core focus of our UTM control center is to automate processes, all the while having safety in mind. Therefore, we also include a conformance monitoring service. Among others, this allows USSPs to see whether a drone stays within the assigned airspace and will issue warnings if there are deviations. Therefore, we had advocated to include this as a mandatory service in Germany, in addition to the four required by EU regulation, since this can greatly enhance safety and



Matthias Gronstedt, Managing Director HHLA Sky, Angela Titzrath, CEO HHLA, and Lars Neumann, Director Logistics HHLA, are pleased about the Red Dot Award: Best of the Best.

automation.

**Q What are some of the challenges that the Drone industry faces for BVLOS specifically?**

**A** Well, building safe drones and systems supporting such operations to mitigate ground risk is one thing, and we, as well as the industry is trying hard to attain that. With very good success.

More importantly, the other chief area to address for flying BVLOS is air risk. The initial concept of U-Spaces addresses this by segregation between manned and unmanned aircraft. Ultimately, full integration of the two is envisioned, but to reduce the “moving parts” and to get going until other challenges are solved, and solutions are rolled out, this route was chosen.

Until equipage with electronic conspicuity of all aircraft is

mandatory and universal visibility is attained, U-Spaces are really a good choice, I believe, and more universal than the corridor concept some are trialing.

In short, the greatest challenge for universal, true BVLOS is the lack of mandated electronic conspicuity. And an adaptation of the Rules of the Air is in order as well (which is being worked on already, though).

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

**A** Deeply integrated services into existing business processes, that's the key feature. Then, you build them with the technology needed. Our ICC, for instance, is an industrial IoT platform. Because it's modular, we can plug in value-add services such as an AI module for automated image analysis. We do this at our

container terminals in the port of Hamburg to speed up asset inspections and lower costs.

I can possibly see such technology to be useful in UTM services as well, e.g., automated route planning, taking into account geo zones, weather conditions, traffic situation, prioritization and such.

But AI often is a bit of a black box. Choosing such technology, for example in flight planning, brings along risks, which need to be taken into account and worked out with the regulator. That is why we initially prefer to apply a more manual approach. Once the moving pieces are better understood by all stakeholders and through real life trials, increased automation will refine those steps or processes.

**Q Finally, what is your perception of overall Drone Industry? What are your suggestions for upcoming start-ups?**





Beauty in action: HHLA Sky's brand-new Automated First Responder Drone X4

**A** We are in the very beginning, exciting times are ahead for unmanned aviation. UTM, the digital air traffic management is bound to be a true game changer, comparable with maybe the introduction of radar or the jet engine. All services in UTM will and will need be digital, to truly capture the potential of automation. In this context, good standards are needed to allow global scaling.

When it comes to drone manufacturing, one challenge we see is the push, and demand, towards ever greater reliability and redundancy, along with performance and endurance increases. This of course is desirable! But the flip side is: This can result in unreasonable and unrealistic costs, where we are quickly entering the sphere of aviation. That is not to say anyone wants to compromise in safety, just: Finding a balanced approach is not trivial.

We also see that cyber security in the context of drones will increase in relevance. Our system has addressed this complex issue from the ground up. This is also a topic in the EU drone strategy, at EASA, at JARUS, and now the FCC as well. With us

being certified at such a demanding standard, we are somewhat ahead of the game here, which is nice.

Let me briefly touch on just two areas. Either way it will take considerable grit, even at the forecasted CAGRs this is not a no-brainer by any means - but can be rewarding. If you are planning on developing and selling drone hardware, this can be exciting. But be prepared to bring along a considerable filled purse and a highly skilled team. And you will be in a marathon: Things will take longer than you anticipated.

Another area that is at times underestimated is Drones as a service. A lot of companies are dabbling in hardware and software, which is important. At the same time, somebody has to carry out the drone services, deploy, manage and maintain the fleets and associated periphery. To do this properly, efficiently, and safe as far as regulations and operations are concerned, suitable tools are needed and can save you a lot of headaches. This is where our Integrated Control Center can really shine, as it leads your crew through consistent and aided processes, produces results

and keeps immutable records of steps taken and actions carried out, along with the possibility to integrate with existing enterprise systems on either end of the process chain. This also allows for automated analysis of data gathered.

**Q** How will you visualize the future of Drones in the coming 5-10 years?

**A** Forgot my crystal ball ... (laughs) On a more serious note, I see drones deployed in ever-increasing numbers. They are helping enterprises and other organizations to run automated tasks, be that in the delivery - likely in B2B intralogistics at first -, in regular industrial inspections - this aids in predictive maintenance! - or helping to secure critical infrastructures.

All this is supported by UTM systems and integration with manned aviation will have reached a new phase. Many of the operations will be carried out from control centers such as ours, and will be integrated with other systems, for full business efficiency and automated data handling, e.g., for digital twins, or supply chains. Our solution may be a bit ahead of the times. However, in talking with clients worldwide, we find that we provide the right framework to forward-thinking organizations.

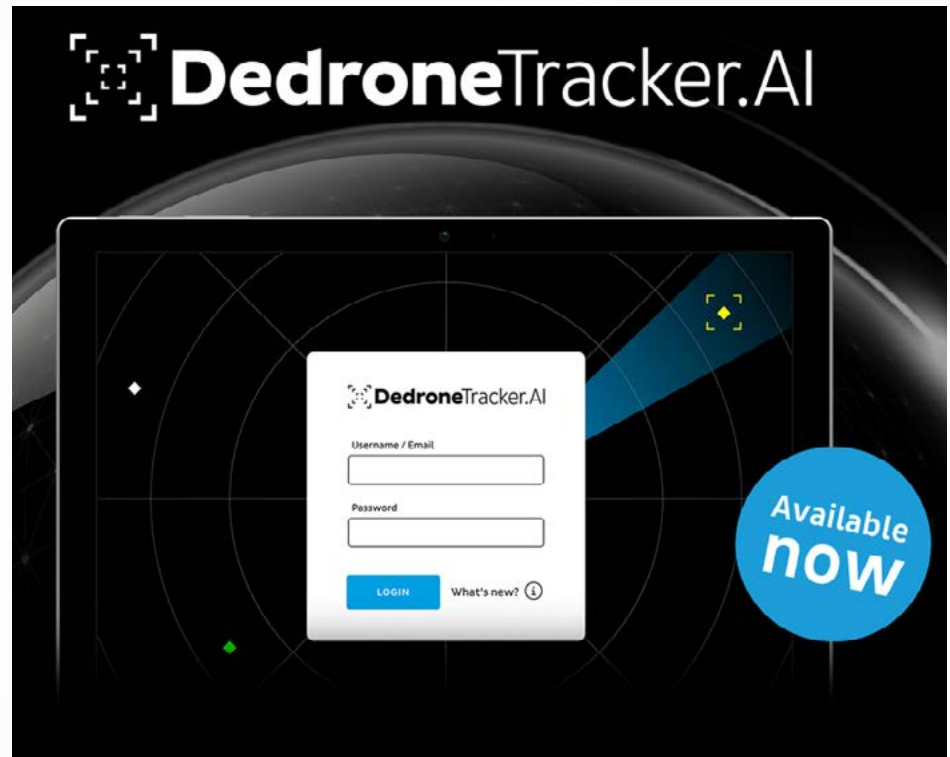
Lastly, there will be countries and jurisdictions that have a hard time preparing for a smooth transition to include UAS into their airspace. And there will be future oriented ones that are talking to the stakeholders today, identify and understand their needs, are willing to try new ways in controlled environments and create performance-based rules today. That will allow our industry to flourish in the near future.

# Dedrone Launches DedroneTracker.AI: the AI-Driven Command and Control Platform enabling the Complete Counterdrone Kill-Chain

Dedrone, the market leader in smart airspace security announced the launch of the newest version of DedroneTracker.AI, Version 6.0. The updates, based on feedback from law enforcement officials, security professionals and military operators in the field, represent a major leap forward in AI/ML enabled autonomous threat detection and classification capabilities demanded by our most strategic customers. DedroneTracker.AI continues to offer best-in-class sensor-fusion, AI/ML enabled threat risk prioritization, autonomous threat interrogation and classification for drones. An early rollout of this version was first adopted by the US federal government as well as a number of NATO member governments and is now available for all Dedrone clients as a software update.

DedroneTracker.AI Version 6.0 also delivers a comprehensive list of US government CsUAS pre-configured integrations, enabling any government customer to rapidly field a "System-Of-Systems" capability with DedroneTracker.AI as the Single Pane of Glass for complex CsUAS systems. Version 6.0 also includes bi-directional integration between the DedroneTracker.AI platform and the Aerial Armor software platform, representing the first step in complete integration between Dedrone and the recently purchased Aerial Armor. In advance of Federal Aviation Administration (FAA) regulations requiring the use of Remote ID enabled drones or broadcast modules becoming effective in September 2023, the new version of DedroneTracker.AI supports the latest US, EU, and Japanese Remote ID standards, and offers improved integration and consolidation of Remote ID detections with non-Remote ID detections.

"With this latest version of our AI platform, we have significantly improved end-to-end autonomy for CUAS and enable safe, productive drone usage," said Aaditya



Devarakonda, CEO of Dedrone. "This leap in capabilities comes from proprietary motion and computer vision models to classify any and all flying objects in a 3D airspace. Additionally, we have data from millions of drone flights and pictures/videos of UAS on different backgrounds constantly training and enhancing these neural networks. Today, our massive sensor network continues to enhance these learning models to the next level creating a moat that truly differentiates our solution versus both legacy and emerging competitors."

DedroneTracker.AI serves as the heart of Dedrone's end-to-end counterdrone solution. By taking inputs from multiple sensors including radio frequency (RF), radar, video and acoustics, it confirms drone presence and determines precise location of drone and pilot. Based on behavior, imagery, historical flight data, and other inputs, the AI engine offers the

operator a single queue of risk-prioritized targets through autonomous background interrogation of unauthorized drones while simultaneously tracking multiple friendly drones. The new version of the software also allows for the operation of mitigation tools directly from the same interface.

The company most recently launched DedroneTactical, its agile counter-small uncrewed aerial system (CsUAS) expeditionary kit for any sUAS-based threat profile and location. The company also offers City-Wide Drone Detection, a zero-install airspace security solution for both law enforcement and security professionals; DedroneFixedSite, an on-site multi-sensor solution designed for easy integration with extant security hardware; and DedroneRapidResponse, a mobile detection unit designed for easy setup and transport. All solutions and kits leverage DedroneTracker.AI and support constant updates to the software.



# Anduril and Epirus Integration Leads to New Counter-UAS Capability

**A**nduril Industries and Epirus recently completed an advanced Counter-Unmanned Aerial Systems (C-UAS) software integration to support technology evaluations from the U.S. Marine Corps Warfighting Laboratory (MCWL) as part of its ongoing efforts to analyze new technologies for the U.S. Marine Corps Force Design 2030 process.

This partnership was made possible through an integration between Epirus' Leonidas system, a high power microwave (HPM) counter-swarm defeat capability, and Anduril's Lattice Command and Control (C2) system. Leonidas is a software-defined HPM weapon with unmatched ability to defeat swarming UAS. With a deep magazine, the system enables near instantaneous defeat of electronic threats. Lattice combines Anduril's state-of-the-art artificial intelligence and machine learning technologies to detect, track, and classify every object of interest in an operator's vicinity.

Lattice combines all phases of the C-UAS kill chain into a modern open architecture operating system, providing all the tools an operator needs for threat detection, tracking, identification, and defeat in a way that is made available to users across a network, not just locally with the system. Lattice also layers in software capabilities to enable automated sensor processing, robotic controls, sensor fusion, correlation, classification and disposition of targets, and can provide recommended courses of action to the operator to provide a modern defense-in-depth C2 platform that supports multiple Air Defense missions. This integration with Epirus' Leonidas provides a new capability to the warfighter that can be used as a part of a series of various layered defeat capabilities connected to Anduril's Lattice Operating System.

With its software backbone, operators can control Leonidas' HPM pulse with unmatched precision, enabling the system to defeat single UAS in tight crowded spaces or neutralize a hostile UAS swarm



across a wide terrain. Epirus' use of solid-state semiconductors dramatically reduces the size and weight of the system, providing the warfighter with a highly maneuverable and mission ready counter-swarm solution. Leonidas' open application programming interface, modularity, and scalability enable swift integration with other partner platforms and rapid development of additional form factors.

Leonidas' successful integration with Lattice demonstrates the system's ability to rapidly ingest and process inputs including timing, radar track data, commands and more through Lattice to lock and track designated targets. When cued by Lattice, Leonidas effectively neutralizes targets,

without harming operators nor blue force assets. With its open architecture, Lattice makes it possible to compose diverse platforms and payloads made by different industry partners — like Epirus — for various mission solutions and then change them rapidly as threats and technologies evolve.

Anduril and Epirus will continue to collaborate to build new capabilities in support of the MCWL's ongoing efforts to develop and integrate C-UAS sensors, effectors, and C2 systems into concept-based experiments to inform requirements in support of the U.S. Marine Corps' Force Design process to enhance ground forces' ability to detect and defeat small UAS.



## SkyDrive Receives Pre-Order of up to 100 eVTOL Aircraft from CT UAV JSC in Vietnam

**S**kyDrive Inc. a leading Japanese eVTOL aircraft manufacturer headquartered in Toyota City, Japan, and CT UAV JSC in Vietnam announced that they had signed a Memorandum of Understanding (MOU) and CT UAV had agreed on a pre-order of up to 100 SkyDrive eVTOL aircraft "SKYDRIVE."

CT UAV is a subsidiary of CT Group, one multi-business group in Ho Chi Minh City, Vietnam, and developing various kinds of Unmanned Aerial Vehicle (UAV) technologies. MOU Signing Ceremony in Vietnam on July 13, 2023. SkyDrive is currently developing a three-seater electric, vertical takeoff and landing aircraft called "SKYDRIVE." It's eVTOL is in the process of acquiring its Japan Civil Aviation Bureau (JCAB) certification (\*2).

In Vietnam, significant traffic congestion happens daily and is growing. To address this issue, Pacific Group Co Ltd in Vietnam signed an MOU with SkyDrive and agreed on a pre-order of up to 100 eVTOL aircraft in November 2022 (\*3). Thanks to a new pre-order received from CT UAV, the announced pre-order count for SkyDrive's eVTOL in Vietnam has reached 200 units.

CT UAV is supported by CT Group, a company that is operating in 9 business lines. Along with 3 sustainable business lines, CT Group is focusing on 6 high-tech industries to bring Vietnamese intelligence to catch up with the stormy speed of the 4.0 technology revolution, including CT UAV. With the mission to pioneer the integration of artificial intelligence (AI) with UAV technology, CT UAV is creating a smarter and more advanced future and improving the quality of life. SkyDrive and CT UAV will evaluate commercial eVTOL considerations such as vertiports, routes and network planning, infrastructure requirements, and ecosystems with interested stakeholders in launching new mobility solutions in Vietnam.

Comment by Mr. Tran Kim Chung, CT Group President: "We recognize the importance of leveraging its accumulated expertise and technological capabilities in infrastructure development, as well as the development of cutting-edge technologies such as drones and AI. We expect to contribute to the general development of Vietnam on the global market."

Comment by Tomohiro Fukuzawa, SkyDrive Inc. CEO: "We are very grateful for the opportunity to work with CT Group, which is one of the three largest and most comprehensive UAV companies in Vietnam and has a large share of the urban development market, especially in Ho Chi Minh City, in providing eVTOL as a new means of mobility infrastructure that to solve modern society issues such as traffic congestion in Vietnam. It will be our honor to contribute to further social development in Vietnam."

## Textron eAviation Starts Nexus Wind Tunnel Testing



**T**extron eAviation, a Textron Inc. company announced it has commenced wind tunnel testing to support the development of its versatile eVTOL aircraft, Nexus. Testing will validate the performance, stability, and control of the vehicle design to confirm preliminary configuration, range, and speed estimates, as well as how the rotors interact with the vehicle aerodynamics for all phases of flight, including VTOL, transition, and cruise.

Rob Scholl, president and CEO, Textron eAviation, says: "Starting wind tunnel testing is a major milestone for the Nexus, enabling us to calibrate our simulations and validate our design. The Nexus aircraft is designed with a focus on operating economics demanded by customers and meeting the rigorous standards of global safety regulators.

"While eVTOLs have unique configurations in terms of their layout and number of rotors, Textron eAviation is leveraging the extensive experience of programs like the Bell V22 and V280," Scholl said. "The data and insights gained from this will tunnel testing will allow us to further refine our models and designs to design a viable, leading eVTOL aircraft."

The Nexus wind tunnel test is being conducted on a 23% scale model to evaluate the rotors at the full range of conversion angles and power levels, drawing on Textron's decades of test experience from its tilt rotor, turboprop, and jet aircraft product development. The tests also provide immediate information related to tail size, engine power requirements, transition strategies, hover net thrust and aerodynamic drag, clearing the path towards final requirements that meet certification standards.

Textron eAviation comprises the Nexus program, its eVTOL division, and Pipistrel, its Slovenian light sport aircraft manufacturer. The latest model of the Nexus eVTOL is designed to have the potential to serve a range of purposes, including for the passenger transport, cargo, and emergency medical services markets.





## Eve Air Mobility and Embraer Announce 1st eVTOL Production Location in Brazil

**E**ve Air Mobility and Embraer announced that the first electric vertical take-off and landing aircraft (eVTOL) production facility will be located in the city of Taubaté, in the state of São Paulo, Brazil. Subject to the final authorities' approval, the manufacturing plant will be situated on a designated portion of land within Embraer's existing unit in the city that will be expanded.

The site benefits from a strategic logistical location, offering easy access via two highways and close proximity to a railroad. Another significant advantage is the region's proximity to Embraer's headquarters in São José dos Campos and Eve's engineering and human resources team, which will facilitate the development and sustainability of new production processes, enhancing Eve's agility and competitiveness.

"When we began our search for a manufacturing location to build our eVTOL, we wanted to reimagine how the aircraft could be built using the latest technology and manufacturing processes, coupled with other aspects such as supply chain and logistics," said Andre Stein, co-CEO of Eve. "Our objective is to offer safe and reliable products and services to the market and be highly competitive in manufacturing efficiency. The team was tasked with the opportunity to design an optimized assembly line that prioritizes safety, quality, efficiency, productivity, and sustainability."

"This decision is aligned with our growth strategy plan, which is driven by innovation and sustainability," said Francisco Gomes Neto, President & CEO at Embraer. "We believe in the enormous potential of the global Urban Air Mobility market, and we reinforce our commitment to Eve as one of the major players in this industry."

In May 2022, Eve announced a partnership with Porsche Consulting to define Eve's eVTOL global manufacturing, supply chain and logistics macro strategy. The two companies have since worked together to research advanced manufacturing and innovation concepts and used their combined aeronautical and automotive expertise to design a concept of industrialization for eVTOL aircraft based on high safety, quality, efficiency and customer focus.

"We are focused on achieving the highest quality standards in eVTOL manufacturing through increased knowledge and consideration of an innovative approach. Following extensive research on advanced manufacturing and innovation concepts for over a year, we are now prepared to establish our initial factory for eVTOL production. With confidence in our capabilities, we are equipped to efficiently scale the production volume sustainably to meet the demands of a growing market," added Alice Altissimo, Vice President of Program Management and Operation at Eve.

## Wisk Aero Completes First-Ever Public Demonstration Flight at EAA AirVenture



**W**isk Aero, a leading Advanced Air Mobility company, has successfully completed the world's first public demonstration flight of a fully autonomous, electric vertical takeoff and landing (eVTOL), fixed-wing air taxi. The milestone flight, which took place at EAA AirVenture, also marked the company's first public demonstration of its 5th Generation autonomous, eVTOL technology demonstrator (Cora). Wisk completed a multi-transition flight, during which the air taxi transitioned from hover to wing borne flight four times. The flight also included multiple maneuvers that demonstrated the unique capabilities of the aircraft, such as hover, 360-degree turns in place, and more.

"We're proud to demonstrate the autonomous technology behind our self-flying first approach," said Brian Yutko, CEO of Wisk. "This demonstration showcases the state of readiness for autonomous technology and electric propulsion. Combined with the progress we're making on Type Certification for our 6th Generation air taxi, we're proving that autonomy is possible and it's happening today. We look forward to launching the first passenger service on an all-electric, autonomous air taxi within this decade."

"We are thrilled to be able to share 13+ years of aviation milestones and now another first with the public. Oshkosh is a particularly fitting milestone venue as it embodies the spirit of passion and innovation at Wisk. We've shared something that is really special. For the first time, we have publicly demonstrated fully autonomous flight, conducted by an all-electric, fly-by-wire, vertical takeoff and landing aircraft. There was no pilot on board, no pilot controls in the aircraft, and no stick-and-rudder on the ground. The entire flight was operated with the push of a button," said Jim Tighe, Chief Technology Officer at Wisk.

# Joby Marks Production Launch, Receives Permit to Fly 1st Aircraft Built on Production Line

Joby Aviation, Inc., a company developing all-electric aircraft for commercial passenger service announced it has received a Special Airworthiness Certificate for the first aircraft built at its Pilot Production Line in Marina, California. Issued by the Federal Aviation Administration, the certificate allows Joby to begin flight testing of its first production prototype.

The aircraft is expected to become the first ever eVTOL aircraft to be delivered to a customer when it moves to Edwards Air Force Base in 2024 to be operated by Joby as part of the Company's Agility Prime contract with the U.S. Air Force, worth up to \$131 million.

Joby has been flying full size aircraft since 2017 and its pre-production prototype aircraft have flown more than 30,000 miles since 2019. Today's production prototype builds on that experience and marks another important step toward achieving FAA certification and production at scale. Commenting on Joby's progress, Joe Ben Bevirt, founder and CEO of Joby, said: "Today's achievement is the culmination of years of investment in our processes and technology and it marks a major step on our journey to scaled production."

"We're proud to have launched production in our home state of California. I'm incredibly grateful to the Joby team for their commitment to ensuring Joby remains the clear leader in this new sector and to Toyota for sharing their knowledge and experience with us over many years. Their support has been indispensable in helping us reach this point."

California Governor Gavin Newsom visited Joby's facilities on Sunday to meet with Joby team members and celebrate the Company's progress.

"California is proud to be home to some of the world's most innovative companies. Joby is changing the game when it comes to the next frontier of flight: zero emission aviation," said Governor Gavin Newsom. "Our world-leading climate action relies on the technological advances and pioneering



spirit of the private sector. Creating jobs and cutting pollution — that's the California way."

Recognizing the key role Toyota has played in the design of Joby's Pilot Production Line, as well as in the production and assembly of the Joby aircraft, Tetsuo "Ted" Ogawa, President and Chief Executive Officer of Toyota Motor North America, Inc., will join more than 1,000 guests and team members at Joby's Marina facility later today to celebrate the launch of production. Ogawa, who will join Joby's Board of Directors on July 1, 2023, said: "We congratulate Joby on reaching this milestone and look forward to working ever more closely as Joby prepares to scale production and start operations."

Toyota is Joby's largest external shareholder, having invested around \$400 million in the Company, and the two companies recently signed a long-term agreement for the supply of powertrain and actuation components.

Joby's production prototype aircraft has been manufactured in accordance with a released design and built according to a complete implementation of a quality management system — an important

step on the path to achieving the Federal Aviation Administration type certification required to begin commercial passenger operations.

Joby plans to begin commercial passenger operations in 2025 and recently partnered with Delta Air Lines to deliver seamless, emissions-free travel for Delta customers traveling to and from airports. Gail Grimmett, Senior Vice President, Sustainability Performance and Strategic Partnerships at Delta, said: "Today marks an important step forward on the journey to deliver a more sustainable future of travel while elevating the customer experience. The innovation know-how and spirit that drives Joby made today's celebration possible and we're excited to march one step closer to offering this service to our customers."

During today's event, the team behind Joby's aircraft will highlight some of the incredible engineering that sets Joby's aircraft apart as well as confirming the expected performance of its production aircraft. The aircraft will now undergo initial flight testing before being delivered to Edwards Air Force Base, California, where it will be used to demonstrate a range of potential logistics use cases.





## Opener Early Access Program Moves BlackFly Closer to General Release

**O**pener, the market leader in light eVTOL aircraft unveiled its Early Access Program (EAP), a significant milestone towards achieving market readiness and successful commercialization of BlackFly. In addition to allowing early BlackFly owners to take off on adventures, the program enables a select group of participants to provide Opener with invaluable feedback on every aspect of their customer experience.

"We have a sound and novel aircraft design," said Ken Karklin, CEO, Opener. "Opener's EAP establishes a two-way communication channel to inform how we address customer concerns, refine features, and optimize the overall user experience. Our close partnership with early adopters is a huge step toward moving us closer to general release and fulfilling the promise of personal aerial freedom."

"Flight in a BlackFly is amazing. Even though I've been in and around aircraft for years, this is my first time as an official VTOL pilot," said Tim Lum, BlackFly owner and Opener's first EAP partner. "And the connection with my BlackFly goes well beyond the aircraft itself. It's all the things that Opener does to assist me — from extensive flight training to delivery and ongoing support. The level of hands-on service is off the charts."

To learn more about Opener's Early Access Program and register your interest, please visit our website: <https://opener.aero/early-access-program>. Limited opportunities are available.

### Light eVTOL Aircraft

Opener is a pioneer in light eVTOL aircraft. Over the past decade, the company has been perfecting BlackFly, its first vehicle, based on its tilt-aircraft architecture.

BlackFly is designed to comply with FAA Part 103 (Ultralight) category, which supports consumer recreation and short-hop travel, and is flyable in Class G airspace over uncongested areas. No pilot certificate is required to fly BlackFly.

Building on the success of BlackFly and leveraging the tilt-aircraft architecture, additional light eVTOL systems are in development for public service, military, in both uncrewed and optionally-crewed applications.

To ensure safe operation of BlackFly, Opener requires each pilot to undergo comprehensive flight training.

## AutoFlight achieves formation flight of three full-scale eVTOL aircraft



**I**n a milestone moment for the aviation industry, AutoFlight, a leader in autonomous electric vertical takeoff and landing (eVTOL) technology, successfully executed a world first formation flight of three autonomous eVTOL aircraft in Shanghai, China. Three of AutoFlight's industry-leading "Prosperity I" models were involved in the groundbreaking flight, demonstrating the company's capability in rapid prototype design, manufacturing, and its ambition to shape the future of aerial transportation.

"We aim to complement urban and regional means of transport for all people by building very safe, quiet, and affordable airtaxis," says Tian Yu, Founder of AutoFlight, who has decades of experience developing and delivering remotely piloted aircraft at an immense scale.

Lukasz Gadowski, legendary technology entrepreneur, investor, and backer of AutoFlight, adds, "It is a delight to be part of a venture that's reshaping the frontiers of technology and innovation. With this successful flight, we have set a new standard for the eVTOL industry."

The company, with dual headquarters in Augsburg, Germany, and Shanghai, China, previously achieved a world record flight in February 2023 where one of their prototypes covered 250 km on a single battery charge, demonstrating the potential for sustainability in the sector.

Over the past 18 months, AutoFlight has continued to revolutionize eVTOL technology, achieving a series of world firsts: the first full-scale eVTOL transition flight in January 2022 and the first eVTOL full length flight video release in June 2022.

The historic formation flight saw three generations of the "Prosperity I" aircraft, indicating the rapid evolution of the aircraft's development. The company plans to make the prototypes into products, with a cargo version set to be released for safe cargo transport in Asia next year, and a passenger version gradually developed in the coming years, meeting the highest safety standards for aviation.

"The formation flight is a testament to our commitment towards making aerial transport safe, sustainable, and accessible," says Mark Henning, former Airbus Helicopter Engineering Chief and head of the AutoFlight Europe team. "We have much more to come."



Drones World Editor Kartikeya in  
Conversation with

**Mr. GV Sreeramam**  
Founder & CEO of NeoGeoInfo Technologies  
Pvt. Ltd.

**Q** How best can you describe the journey of yours since its humble beginnings to where it is now?

**A** It's a phenomenal journey all through. Establishing a competency, winning customer confidence and successfully delivering to a need is not an easy problem to solve. Doing it repeatedly is a humongous task and we at NeoGeoInfo are proud that we have a well knitted team, committed to the technology, customer and progress. It almost became a habit once a critical mass is achieved. We strongly believe that

"Find good people first and then they will anyway do good things"

We built a culture within our organization that values their time/work, focus on quality and partners with customer – even in all challenging situations. It's not as if we didn't have failures or we have not committed mistakes, for us it is about how we, as a team worked our way through such situations. Our teams worked during Covid times and adapted to a new style of working (from home), without compromising on deliverables. We have reached a phase of consolidation and we are poised for growth and expansions. In the coming years we will extend our offerings and ensure our employees get bigger opportunities to perform and flourish. We are experimenting Platformization in a couple of areas, you will hear about them soon. Overall, a lot of learnings and ability to stand up as a team. On the way, it also makes us happy that NeoGeoInfo is featured in multiple Top 10 lists for Geospatial companies in India by various magazines and rating agencies.





Map  
Model  
Manage

**Q** What are the services currently offered by Neo Geo? Can you share some nostalgic project details which you are proud of?

**A** We are a full stack Geospatial Solutions provider.

NeoGeoInfo Technologies is a 200+ people strong SEI CMM Level3 Consultancy and Implementation Services Provider using Geospatial Technologies with Rich Experience in System Integration, Development and in providing Engineering Solutions. NeoGeoInfo is proficient in Cognitive Technologies (AI/ Machine Learning/ Robotic Process Automation), Analytics and in developing solutions using web/ mobile apps.

NeoGeoInfo is focused on the ULB Level Governance Solutions (Property Tax, Digital Door Numbers, Land Resurvey Projects, Cadastral Map Digitization, Town Planning, Smart Cities and Surveillance) and Cross-Country Infrastructure /Utilities projects (Highways, Telecom/OFC, Gas/ CGD, Power Transmission, Water Networks).

NeoGeoInfo' deeply differentiate from other solution providers based on the strength of domain knowledge in these areas.

We centred around our Map, Model and Manage which in layman terms translate to Data Acquisition, Data Processing and Data Management. We offer the best-in-class data acquisition technology, technique, teams and range of solutions. Our data processing algorithms are more accurate and has the ability to extract the full intelligence out of the data presented. NeoGeo' application development teams ensure the right person has the actionable intelligence at the right time and right place. We are proud of our association in the 1st ever property tax project in India, 1st successfully implemented CORS in a full state, 1st Analytics listed product in GeMS and Collaborated with majority of the Govt and Corporate clients in India.

**Q** How important is GIS planning required in preparing smart cities and what type of challenges are there in implementation? What other Industries haven't utilised GIS fully?

**A** To me Smart City and Geospatial are inseparable. I am not talking about Smart City as in a city with ICCC (Integrated Command Control Centre), but a city that can sustainably grow, accommodate for (frequent) natural calamities, safer for

citizens (pollution, noise, security) and maintained in a eco-friendly way (this takes a lot of resources and disciplined citizens too). To create a real Smart City, Geospatial technology is a must as a planning, tracking and maintenance enabler. Thanks to the Digital Twins and 3D Maps – the planning become much closer to reality to the centimetre level accuracy. The IoT sensors and other edge devices constantly relay the information from all over the city in real/ near real-time to Track, Analyse and take data driven decisions. Analytics and Simulation makes the maintenance predictive and best practice. The whole set of safety solutions in public transportation is a big example of all technologies coming together to synergize the value.

**Q** What are the differences you can say before or after drones came into GIS? What are the precautions one should take in the GIS & Drone Industry to flourish more?

**A** Significant difference is the philosophical thought that all (restrictions) that is existing can be nullified... I mean the drone policy (in one stroke) changed the data acquisition framework so completely and differently that there is no comparison between what existed and what is new/



currently in force. This also gave thrust to a new Geospatial policy (of course, the thinktank almost made the changes imminent) and it is as radically different as the drone policy. The outlook of the policy makers is now extremely progressive and it is going to benefit all the players (direct and ancillary). At a micro level – the rules of data acquisition have changed significantly for certain sectors. But I sincerely feel that caution to be practiced in application. Like Maslow (law of instrumentation) says “If the only

tool you have is a hammer, you tend to see every problem as a nail”. We should be judicious in deciding where to apply the drone for data acquisition (more importantly where we will NOT apply) – because every unsuccessful project brings a blackmark on the (drone/ geospatial) technology, which should be prevented at any cost.

**Q What do you see as the biggest challenges & opportunities in the Indian GIS / Drone Industry?**

**A** Major Challenge across all industries is the same... availability of skilled (ready to deploy) resources. In Geospatial Industry it is not just limited to the human resources, for example if we want to deploy a certain type of mapping drone – we still have constraints around their availability. The other one I think of is about the specificity of user requirements and the knowledge applied.

**Q What is your message to youngsters who wish to enter in the GIS/ Drone industry?**

**A** Unfortunately, many youngsters have a notion that GIS Industry is primarily about some maps and the typical industry salary structures are lower compared to mainstream IT sector. Luckily it is a wrong notion and I'm happy that no one can ignore Geospatial anymore, because the current amalgamation of IoT, Blockchain and Geospatial creates deeply differentiable value to customers. I am positive and making a lot of efforts to meet and hire the bright young people who will change not only the perception, but also pave a way for more people to follow the path.

**Q And to conclude on high spirits, could you list out your wishes for a development of our GIS / Drone Industry, society & Economy?**

**A** I only wish that we value the services we offer and price them correctly. Once this is achieved, everything else will automatically fall in place. One can contribute positively and significantly to others in the ecosystem, society and economy only if they have resources to do so. Prosperity attracts and bring a lot of positivity.





## Esri Releases Latest Land Cover Map with Improved AI Modeling

**L**and-use/Land-cover (LULC) maps contextualize and quantify the impacts of earth processes and human activity on the environment. Organizations around the world are now using these tools to inform policy and land management decisions around issues like sustainable development. In continued support of these users and their goals, Esri, the global leader in location intelligence, in partnership with Impact Observatory, has released a global land-use/land-cover map of the world based on the most up-to-date 10-meter Sentinel-2 satellite data for every year since 2017. Following the latest 2022 data released earlier this year, the artificial intelligence (AI) model for classification has been improved, making the maps more temporally consistent.

Year-over-year changes detected in the LULC time series maps can be key indicators for analysts and decision-makers. The AI model performing the global classification has been optimized to reduce model insufficiency, class ambiguity, and sensitivity to seasonal variability. The result is a higher confidence that changes detected represent meaningful real-world changes.

"Users are working with maps that will accurately reflect events and earth processes that are happening in reality," said Sean Breyer, Esri program manager for ArcGIS Living Atlas of the World. "We are constantly updating our land-cover map with new data and features, and this latest improvement ensures that anyone viewing temporal change can be confident what they are seeing represents the natural world."

With planned annual releases, users have the option to make year-over-year comparisons in global land cover today and into the future. This is especially important for organizations like national government resource agencies that use this data to define land-planning priorities and determine budget allocations. Governments, businesses, and scientists can now more reliably make these data comparisons.

Esri developed its Sentinel-2 10-Meter Land Use/Land Cover Time Series with European Space Agency (ESA) Sentinel-2 imagery hosted on the Microsoft Planetary Computer, and with machine learning workflows developed by Esri Silver partner Impact Observatory.

"With Esri's support, Impact Observatory was able to further improve these fully automated maps of the world, which have already been independently assessed as the most accurate global land-cover maps available," said Steve Brumby, Impact Observatory CEO. "These maps provide important insights into the large-scale patterns of our changing planet."

The global LULC time series is available online to more than 10 million users of geographic information system (GIS) software through Esri's ArcGIS Living Atlas of the World, the foremost collection of geographic information and services, including maps and apps. It can also be viewed on the Sentinel-2 Land Cover Explorer, a dynamic, ready-to-use online application that allows anyone anywhere to easily observe change.

## EUSI Invests in Ground Station Upgrade at the German Aerospace Center (DLR) for the Fastest VHR Satellite Imagery Delivery in Europe



**E**uropean Space Imaging (EUSI) has announced a multi-million euro investment into their ground station at the German Aerospace Center (DLR) near Munich. This strategic upgrade extends EUSI's ability to deliver imagery with remarkable speed and efficiency, solidifying its claim as a hub for Europe's best satellite imagery technology.

On 27 June, EUSI successfully commenced downlinking data from the Maxar WorldView satellite constellation using the newly upgraded ground station, also known as the Direct Access Facility (DAF). This milestone marks the beginning of a new era, as EUSI's customers across Europe can now receive significantly faster Near Real-Time (NRT) deliveries, with processing times of less than 20 minutes after image collection. Moreover, the ground station's better throughput capacity allows for the parallel processing of multiple NRT orders simultaneously.

Though upgraded, the ground station will remain at the DLR in Oberpfaffenhofen, reinforcing the long-standing cooperation between EUSI and DLR. Furthermore, this partnership highlights EUSI's commitment to investing in German space infrastructure and its dedication to advancing the European remote sensing industry. Additionally, the EUSI ground station plays a crucial role in DLR's participation in EU security programs and aligns with the responsibilities outlined by the German space strategy.

Speaking on the project, Adrian Zevenbergen, CEO of European Space Imaging, commented, "The ground station upgrade at the German Aerospace Center represents a significant milestone for EUSI and the entire European Earth Observation community. Our investment in new technologies demonstrates our commitment to positioning Europe as a hub for space-based remote sensing capabilities."



## 1Spatial launches configurable GIS mobile app for surveying

**1** Spatial, the global provider of geospatial software and solutions for improved data governance, is excited to announce the launch of 1Capture – a customisable mobile application for “right first time” data capture. 1Capture is a commercially available mobile GIS editing application that is multi-use, configurable and helps customers address a variety of real-world problems. It provides accurate and reliable GIS data collection and editing in the field for a multitude of asset, job, and survey types.

Customisable rules and actions work to improve your data quality at the point of capture. This ensures good quality data is captured at source, whilst minimising costly re-surveys. The built-in rules engine automatically validates and corrects the GIS and non-GIS data collected, whether working online or offline.

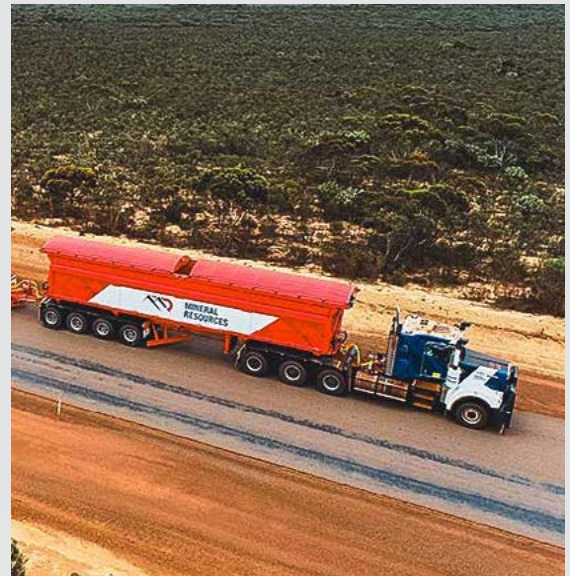
1Capture connects with a variety of GIS environments including Esri ArcGIS and open-source technologies such as PostGIS and Geoserver. 1Capture provides a mobile capability to 1Spatial's other leading geospatial products. Customers using 1Integrate and 1Data Gateway alongside 1Capture can be assured of consistent validation rules for both web and mobile data submissions.

Philip Welch, Senior Product Manager for 1Capture says “1Capture places 1Spatial's core validation capabilities in the palm of your hand to ensure field data is collected in the most effective and accurate way possible. Suitable for any asset model, survey, or job type, 1Capture is flexible and configurable to perform surveys or jobs with a level of assurance not offered by other GIS mobile apps. Automatic validation and correction mean less wasted effort during and after data capture this increases trust in your data and provides a solid foundation for making informed decisions.”

Robert Chell, CPO for 1Spatial added “1Capture's survey capabilities expands our customers' ability to collect trusted, validated data that is right first time. Clean data at the point of survey reduces post-survey processing and the value of that data can be utilised more rapidly. Sharing the rules engine with 1Integrate and 1DataGateway; 1Capture mobile users can pre-validate, or correct failed data submissions using the same rules available in the web.

Through 1Capture, our other products and ongoing enhancements, 1Spatial is committed to providing dynamic market offerings that utilise our world leading data management capabilities, enabling our customers to unlock the value of their data.”

## Hexagon equips the world's first fully autonomous road trains



**H**exagon AB, the global leader in digital reality solutions, combining sensor, software and autonomous technologies, has announced a landmark agreement with leading diversified mining company Mineral Resources (MinRes) to provide an autonomous haulage solution for a fleet of 120 fully autonomous road trains in Australia, which will transform safety, productivity and sustainability in the region.

The world-first, fully autonomous road trains are a full-site, truck-agnostic solution. The addition of unmanned and autonomous systems will form an essential part of the supply chain for the MinRes Onslow Iron project in Western Australia's Pilbara region.

The centre of the autonomous platooning system is Hexagon's autonomous solutions stack integrating drive-by-wire technology with an autonomous management system to orchestrate vehicle movement in road train haulage.

“At Hexagon, we see autonomy as a way to vastly improve our world,” said Paolo Guglielmini, President and CEO, Hexagon. “Today's agreement with MinRes will ensure that off-road transport activities will be safer, more sustainable, and more productive. I'm excited to see how similar solutions can be applied in other off-road markets such as agriculture and heavy industry.”

“We're excited to announce our agreement with Hexagon to deliver the world's first fleet of autonomous road trains, which will be an essential part of Onslow Iron's safe, efficient and dust-free solution for hauling ore,” said Mike Grey, Chief Executive, MinRes. “Automation will remove the risk of driver fatigue, lower operating costs and reduce fuel use and emissions. There's enormous potential for these vehicles to transform mining across the world.”



# Sentera Expands Mapping Capabilities with New Drone System



Sentera, the industry-leading provider of ag analytics announced that its ultra-high-resolution RGB sensor – the 65R – is now compatible with its PHX fixed-wing drone, lowering the cost and time required to produce accurate digital surface models (DSMs) and imagery products for several industries, including agriculture, construction, infrastructure, and environmental monitoring.

65R's global shutter and fast frame rate combine to quickly produce exceptional imagery, free from distortions produced by electronic rolling shutter cameras and with a rugged "no moving parts" design that is ideal for the sometimes-challenging physical environment onboard a drone.

With 65 million pixels per frame of global shutter imagery, the 65R is an outstanding tool

to produce 3D products like DSMs. DSMs have become a critical factor in how businesses and governments make decisions, from planning and development to natural resource management to disaster mitigation. With 65R, the DSM and the RGB imagery product can both be produced from the same dataset.

"3D models have become almost as popular with our customers as our imagery products," said Eric Taipale, chief technology officer, Sentera. "65R is a very high quality imager, and integration of this sensor with a high-efficiency platform like PHX cuts the data acquisition time required to capture large areas by up to 50% versus comparable VTOL platforms."

PHX is one of the most popular high-throughput drone platforms for multispectral

and thermal data production in agriculture, generating data products that enable insights like Stand Count and seed emergence, Tassel Count to identify end-of-season yields, and a range of multispectral-based insights. Because of its design, the fixed-wing drone can cover up to three times more ground than multi-rotor drones in the same amount of time. Now, with the additional of 65R, the platform adds 3D and UHR RGB capabilities.

"PHX has established itself as a rugged, workhorse platform for agricultural users. We're pleased to extend its capabilities to other sectors," said Taipale. "In real-world use, the time and cost efficiency of PHX is market-leading. With 65R on PHX, these productivity benefits can go to work for many more customers."





Drones World Special Editor  
Dr. Pranay Kumar in conversation with  
**Ravi Kondiparthi**  
Vice President  
Marvel Geospatial Solutions

**Q** After an extensive and market leading position in drone services, Marvel Geospatial is now foraying into drone manufacturing. Can you tell us more about the company's vision and plans in this direction?

**A** Marvel has been a pioneer in the field of processing drone data, having started over a decade ago. Building on this extensive experience, we expanded our operations to provide drone data acquisition services in India in 2016. Throughout our journey, we have utilized drones from various manufacturers worldwide, as well as those manufactured locally in India.

The recent government policy banning the import of drones has presented a unique opportunity for us. Recognizing the potential in the Indian market, we have taken the bold decision to delve into drone manufacturing within the country. This strategic move positions us to cater to the specific needs of the industry, capitalizing on our vast experience in data processing and acquisition services.

As industry insiders, we possess an unparalleled understanding of the sector's requirements, setting us apart from most other manufacturers. Our expertise allows us to confidently design and produce drones that precisely meet the demands of the current market.

With our commitment to excellence and innovation, we look forward to contributing significantly to the growth of the drone industry in India. Our locally manufactured drones aim to revolutionize the way businesses utilize aerial data, ushering in a new era of efficiency and productivity.



**Q Please tell us about the specifications of your drone range. What are the applications it would support?**

**A** During the early adoption of drones in India, organizations heavily relied on Chinese drones for their reliability. However, with the recent ban on drone imports, we recognized the need to find alternative solutions. As a result, we dedicated significant effort to research and testing to identify drones that offer enhanced endurance and range, ensuring compliance with the latest policies.

Our pursuit led to the development of our very own drone, the M1, which has proven to be reliable and capable of meeting industry demands. The M1 stands as a testament to our commitment to delivering high-quality and efficient solutions to our clients.

In addition to the M1, we are currently working on another key project M2 – an advanced hexacopter capable of carrying larger payloads such as LiDAR, Thermal, Multispectral, Hyperspectral, and Surveillance equipment. This cutting-edge drone is designed to achieve an impressive endurance of 40-60 minutes, enabling extended flight operations for critical applications.

With our relentless focus on innovation and performance, we aim to offering solutions that cater to a wide range of industries and applications. Our commitment to providing reliable and efficient aerial platforms remains unwavering as we continue to push the boundaries of what's possible in the world of drones.

**Q Which sectors will be your priority areas?**

**A** Our company's core focus lies

in several key areas that are critical to various industries and sectors. Our expertise are primarily directed towards:

**i. Survey and Mapping:** We offer cutting-edge drone solutions for surveying and mapping applications. By utilizing advanced aerial technology, we provide precise and efficient data collection for land surveys, construction site mapping, urban planning, and more. Our drones enable accurate measurements, reduced project timelines, and improved decision-making processes.

**ii. Agri Spraying and Precision Farming:** With a deep understanding of the agricultural sector's evolving needs, we have developed specialized drones for agri spraying and precision farming. Our drones are equipped to disperse fertilizers, pesticides, and other agricultural inputs efficiently, promoting sustainable practices and optimizing crop yields.

**iii. Surveillance:** Our drone technology plays a vital role in surveillance and security applications. Whether it's monitoring large areas, inspecting critical infrastructure, or assisting law enforcement, our drones deliver real-time data, enhancing situational awareness and ensuring safety.

**iv. Renewable Energy:** Embracing the global shift towards renewable energy, Our drone is tailor made to the renewable energy industry. Our drones enable efficient inspection and maintenance of solar panels, wind turbines, and other renewable energy assets, ensuring optimal performance and minimal downtime.

**v. Mining:** In the mining sector, our drones are instrumental in conducting aerial surveys, volumetric measurements, and monitoring mining operations. With our advanced capabilities, mining companies can improve resource management, enhance safety

protocols, and streamline their operations.

vi. By focusing on these key areas, we aim to provide industry-specific solutions that address the unique challenges and requirements of our clients. Through continuous innovation and a customer-centric approach.

**Q What are the compliances met by your drone range?**

**A** Following extensive research and development, we are happy to announce that we are now on the verge of commencing the type certification process. Our dedicated efforts and rigorous trials have brought us to this significant milestone, and we anticipate completing the certification within the next 3 to 6 months.

The type certification process is a crucial step that demonstrates the compliance, reliability, and safety of our drone technology. It represents a culmination of our team's hard work and commitment to excellence in engineering and innovation.

**Q Drone manufacturing in India is getting very competitive. What are your USPs and plans to establish your position in this market?**

**A** Leveraging our vast experience in Drone Data processing and acquisition, we have designed drones that precisely address industry requirements. Drone Services companies across various sectors can confidently prefer our efficient and reliable aerial solutions for their operations. Our state-of-the-art technology ensures exceptional performance, making us the ideal choice for enhanced offerings and transformative growth in the drone industry.

## PDRL and DroneAacharya joining forces to cultivate expertise on AeroMegh Platform; Empowering Professionals in the Drone Industry Revolution!

**P** DRL, an esteemed software enterprise, is thrilled to unveil an innovative certification initiative designed for the transformative AeroMegh platform, heralding a new era for the drone sector. In light of the escalating proliferation of drones and their multifaceted applications, the demand for adept professionals who can unleash the full potential of this technology is intensifying rapidly. PDRL's AeroMegh platform, complemented by its all-encompassing certification program, empowers professionals with the acumen and proficiency required to thrive in this dynamically evolving domain.

AeroMegh, an ingenious Software-as-a-Service (SaaS) offering, presents a holistic end-to-end solution catering to drone data acquisition, processing, analysis, and flight operations. By harnessing the capabilities of this robust platform, users can adeptly execute intricate tasks while conserving precious time and resources. PDRL's certification initiative extends a golden opportunity for professionals to acquire a profound understanding and mastery of AeroMegh, thereby bestowing them with a distinct competitive edge within the industry.

Positioned as a cornerstone of the drone industry revolution, PDRL takes pride in its role, with over 50% of drone manufacturers endorsed under the AeroGCS type certification, and an impressive 75% of agriculture drones certified with AeroGCS GREEN, an integral facet of the AeroMegh suite. This clearly underscores the evident demand for adept resources. In response, PDRL has meticulously devised a certification program aimed at enhancing the technical knowledge and competencies essential in the burgeoning drone ecosystem. Participants of this program gain hands-on familiarity with the AeroMegh platform, honing their proficiency in its functionalities and applications. Completion of the program culminates in the prestigious PDRL certified drone professional designation, effectively distinguishing them within their professional milieu.

The comprehensive certification



curriculum encompasses the entirety of drone operations, ranging from flight management to data acquisition, processing, and interpretation. Participants are armed with practical training, equipping them to adeptly navigate the complexities intrinsic to the thriving drone sector. The PDRL certification serves as a definitive endorsement, affirming that professionals possess the requisite expertise and commitment to excel in the fast-paced, ever-evolving drone landscape.

To ensure the widespread accessibility of this program, PDRL has strategically joined forces with DroneAacharya. DroneAacharya Aerial Innovations Limited, an all-encompassing drone solutions provider, boasts a wealth of expertise encompassing drone services, training, manufacturing, and automation. Headquartered in Pune, Maharashtra, DroneAacharya is a certified DGCA drone pilot training organization, with operational centers in both Maharashtra and Gujarat. Bolstered by a team of technological stalwarts, they furnish a tailored suite of Industrial and Enterprise solutions catering to Agriculture, Mining, Energy, Infrastructure, Utilities, and Defense sectors. Remarkably, DroneAacharya Aerial Innovations Limited holds the distinction of being the pioneer Indian drone startup to go public and be listed on the BSE-SME exchange, underscoring their commitment to excellence and pioneering spirit. This partnership with DroneAacharya is poised to amplify the program's outreach, making PDRL's expertise accessible to professionals from diverse backgrounds and

regions.

At the vanguard of empowering professionals within the drone industry revolution stands PDRL's AeroMegh platform and its certification program. As the industry continues its onward march, the significance of skilled individuals is more pronounced than ever. PDRL's vision and dedication to harnessing drone data for actionable insights are manifest in its meticulous certification initiative. This milestone epitomizes PDRL's unwavering commitment to shaping the future of the drone industry, presenting boundless value to aspiring professionals and investors alike.

Prateek Srivastava, Founder and Managing Director at DroneAacharya Aerial Innovations Limited, articulated, "We recognize the significance of proficient resources, and imparting quality training through experienced mentors is an infallible method of empowering the contemporary workforce. Through our partnership with PDRL, we aspire to offer comprehensive training encompassing drone mapping and data management, enabling drone professionals to deliver exceptional services across diverse industries."

Anil Chandaliya, Chief Executive Officer at PDRL, noted, "PDRL has embarked on a mission to certify 10,000 professionals on the AeroMegh platform. Collaborating with DroneAacharya undoubtedly accelerates this trajectory. Together, we will expedite the creation of skilled resources and foster increased job opportunities within the industry, with the overarching ambition of positioning India as a Drone Hub by 2030."





Drones World Special Editor Dr. Pranay Kumar in conversation with

**Mr. Amit Gupta**

Managing Director of BBPL Aero Pvt Ltd

**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** We are into Electronic Manufacturing since last 13 years, 2 years back we ventured into Drones. Initially BBPL Aero Pvt Ltd was a fully owned subsidiary of our other company "Bright Beginning's Pvt Ltd" and then later on it was converted into a separate company. We started with Agri Drones but now we are making many models for almost all applications. Initially it was only assembly and testing of Drones and with passage of time we have started with frame manufacturing also. We have started with VTOL frame manufacturing for our main model. We will add carbon fiber rods and plates, after this we will add frame for our other VTOL models.

We have a fully automatic SMT and MI lines also for Pcb assembling. A Joint Venture with a European company is also in pipeline for manufacturing Drone Electronics, expecting it to start by the end of this year. It might take a year more but we intend to manufacture all Drone Electronics also then only we can have a better control on product quality. For software development our two associate partner's works on client requirements.

**Q** How long do you consider to get final certification & to start production? Any Orders or LOI's?

**A** Our main product line doesn't require type test certification, Lab certifications is needed which we get as per the client specifications. We are already in production. We already

have an order of USD 2.85 mn and LOI for USD 6.65 mn for manufacturing of Nano Drones which has to complete till March 24. We are struggling with high lead time of electronic components but we are hopeful we will match this target date.

**Q** Talking about your unmanned offerings, what are the products & its capabilities in terms of civil and military application?

**A** Our product range includes Surveillance Drones both Quadcopter & VTOL, Logistics VTOL, Tethered Drone, Mob Control Drone, Fire Fighting Drones. Our VTOL has high altitude capabilities. We have done successful Demos of Swarm drones too. We are adding up Hybrid Drones for better endurance and reliability. For few of our products to be used in civil applications we are in the process of applying type test certification.

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

**A** India market has huge opportunity and this market can grow multi fold. Both Defence and Civilian market has better opportunities but for Defence we need to have much better products and there is a long way to go to match international offerings. For Civilian market India already has good product range and Drones can be used in multiple applications so Civilian market is the best at the moment. Although getting type test certificate for each model is very costly and lengthy process specially when there is no surety on the order quantity. This will slow down adaption of new models in different applications in civilian market.

**Q** Where do you see BBPL Aero in the next five or ten years in the Indian market? Do you have specific markets in target?

**A** In next 5 years we expect to see good results of all the efforts we are putting in doing right now in terms of investment, manufacturing frames and





Electronics for our Drones in-house, Exporting Drones, catering to Indian Defence with latest technologies.

**Q How do you think Indian drone manufacturers can reach the benchmarks set by International Companies?**

**A** Indian drone manufacturers have the technical strength and potential to reach these benchmarks. As we see in our other group manufacturing companies in other industries like Textiles, Lighting & Consumer Electronics India is already

competing well with International companies. In Drones we can surely achieve as well as set new benchmarks but it has to be backed by strong product development and local raw material manufacturing specially Motors and Electronics.

**Q Can you give us some valuable suggestions for the Drone-prenuers and the Drone pilots?**

**A** Persistence is the key word for all the Droneprenuers. The journey might get difficult at times, as most of the

Droneprenuer's are newbies in this sector like us who are into testing, inventing, pitching new ideas and putting their hard work. But after all the efforts, we have to rely on outsourcing of foreign products. We need to promote make in India and develop a reliable and technologically sound market for electronic components, motor and other products.

For drone pilots I just have one suggestion be very technically sound in your working as you are the whole sole person responsible for safety of the product and people around.



Amit Gupta Managing Director, Arvind Raghav, Co Founder and CEO, Sandhya: Deputy CEO, Nitin Yadav Senior Manager Product Development



Drones World Editor Kartikeya in conversation with

**Ms.Shreya Rastogi**

Founder & CEO of S R Aerospace Solutions LLP



**Q What has been your journey so far?**

**A** My journey so far has been shaped by a strong family background in manufacturing and a passion for aerospace engineering. My father, an entrepreneur, started a successful metal manufacturing business from the ground up, providing me with valuable insights into the world of manufacturing and instilling in me the importance of thinking at scale.

I pursued my undergraduate education at the prestigious University of California, Davis, where I earned dual degrees in Mechanical Engineering and Aerospace Engineering. During my time at the university, I not only gained a solid academic foundation but also seized opportunities to expand my knowledge and skills. I obtained my pilot's license, allowing me to understand the practical aspects of aviation.

Additionally, I had the privilege of working as an undergraduate researcher in the university's Advanced Composites lab. This experience granted me invaluable exposure to cutting-edge technologies and the opportunity to collaborate on projects with esteemed organizations such as the US Navy, US Department of Energy, and NASA. As the Lead researcher for an R&D lab at NASA, I played a pivotal role in developing components that continue to be utilized to this day, further fueling my passion for aerospace innovation.

Following my time at NASA, I delved into the drone industry by joining ePlane, where I undertook a comprehensive analysis of the drone market in India. It was during this period that I identified

a fundamental supply chain gap adversely affecting all Indian players in the industry. Drawing on my background in manufacturing and my experiences with aerospace technology, I realized that I was uniquely qualified to address this challenge.

In 2022, I took the bold step of founding S R Aerospace, a company dedicated to producing state-of-the-art UAV propellers, UAV motors, and other essential components. Leveraging my expertise and insights gained from my diverse experiences, I set out on a mission to bridge the supply chain gap and provide Indian UAV enthusiasts and businesses with top-tier drone parts.

**Q Tell us more about your product lineup**

**A** At S R Aerospace, we take immense pride in our product offerings, designed to cater to the diverse needs of the drone industry. Currently, we specialize in supplying high-quality propellers, with a particular focus on matching existing propeller configurations ranging from 16

inches to 2 meters in diameter. Our propellers are meticulously crafted to deliver outstanding performance, and we ensure that they not only meet but surpass all other propellers available in the market across every standard performance metric in the industry.

Moreover, we are continually pushing the boundaries of innovation, and as part of our commitment to excellence, we have a line of motors set to launch in just two months. These motors have undergone rigorous testing, demonstrating industry-leading performance capabilities. With these motors, we aim to elevate the performance of drones to new heights and provide our customers with an unparalleled flying experience.

We understand that each customer may have unique requirements for their drone applications. To address this, we offer a robust product customization service, catering to specific needs and preferences. Whether it's adjusting the propeller design for specialized applications or creating tailored



motor solutions for specific drone models, our team of experts is dedicated to delivering custom products that perfectly align with our customers' requirements.

Our focus on research, innovation, and stringent quality control measures allows us to deliver products that not only meet the highest industry standards but also exceed our customers' expectations. As a homegrown drone manufacturing company in India, we are committed to supporting the growth of the drone ecosystem in the country and empowering enthusiasts and businesses alike with cutting-edge technology and unmatched support.

**Q How are you approaching the Indian drone market?**

**A** We have adopted a strategic and ambitious approach to address the challenges and opportunities in the Indian drone market. Recognizing the restricted supply chain due to current laws prohibiting direct imports of drone parts from China, we are committed to revolutionizing the availability and accessibility of high-quality drone components within India.

To overcome the supply chain limitations, we made significant investments into developing our in-house manufacturing capabilities and streamlined processes. By doing so, we have taken control of the entire production cycle, ensuring that our customers receive top-tier drone parts without facing the delays and fines associated with import loopholes.

A key aspect of our approach is the unwavering commitment to quality and excellence. We



[www.sraeros.com](http://www.sraeros.com)

understand that to compete in the Indian drone market, our products must meet the highest standards of performance and reliability. Therefore, we have spared no expense in acquiring the most advanced machinery and technology available globally. This investment ensures that our manufacturing processes are at the cutting edge, allowing us to produce drone parts that consistently outperform competitors in the industry.

As part of our mission to cater to the growing demands of the

Indian drone market, we are rapidly scaling up our production capabilities. By next year, we aim to achieve an impressive production capacity of 20,000+ propellers per month. This scale not only allows us to meet the increasing demand but also enables us to be responsive to our customers' needs promptly.

**Q How do you want to affect the drone industry in India and abroad?**

**A** At S R Aerospace, our overarching vision is to



revolutionize the drone industry, both within India and globally. Our strategic approach encompasses several key elements, each contributing to our mission of driving positive change:

Firstly, we aim to bolster the drone industry by introducing high-quality drone parts to the market. Our relentless focus on research, development, and manufacturing ensures that our propellers, motors, and components meet and exceed industry standards. By offering reliable and performance-driven parts, we empower drone manufacturers, enthusiasts, and businesses in India to build advanced and efficient drones, ultimately leading to enhanced operational capabilities and safer flights.


Secondly, we are dedicated to adopting a data-driven approach to product development, fostering more effective practices within the Indian drone industry. By investing in advanced technologies and leveraging data analytics, we optimize our product development processes. Through the analysis of real-world applications and customer feedback, we gain valuable insights to continually refine and enhance our drone parts, resulting in more efficient and tailored solutions for the Indian market.

Thirdly, we recognize the significance of developing custom solutions to address the unique challenges and requirements of the Indian drone market. Our team of experts collaborates closely with customers to understand their specific needs and applications. This enables us to create customized drone parts that are optimized for diverse purposes, ranging from agricultural surveying to industrial inspections. By empowering Indian drones

with tailor-made components, we strive to ensure they can compete with and even surpass international competitors in terms of performance and versatility.

Lastly, while our primary focus is on the Indian market, we also aspire to extend our influence globally. Our commitment to producing category-leading drone parts positions us to sell our products abroad, thereby promoting the credibility and legitimacy of the Indian drone industry on the international stage. By offering our cutting-edge drone parts to customers worldwide, we aim to showcase India's capabilities and make significant contributions to the advancement of drone technology on a global scale.

#### **Tell us more about your team**


 Our team at S R Aerospace is a group of highly skilled professionals, driven by a passion for excellence in engineering and manufacturing. We take immense pride in the diversity and expertise that each member brings to the table. Our team is a fusion of talents from top institutions and organizations across India, representing a rich blend of experiences and knowledge.

Our recruitment process is meticulous, ensuring that we assemble a team that embodies innovation, dedication, and a commitment to quality. Our team members come from diverse educational backgrounds, including aerospace engineering, mechanical engineering, robotics, and data analytics, among others. This interdisciplinary approach allows us to tackle complex challenges in the drone industry from multiple angles, fostering a

collaborative and dynamic work environment.

Moreover, we have taken great strides to invest deeply in our local community. As a part of our commitment to social responsibility and gender equality, we have actively worked to hire and train women from humble backgrounds. By providing them with equal opportunities and rigorous training, we aim to empower them with the skills and expertise to excel in the drone industry. This initiative not only enriches our team but also contributes to the development of a more inclusive and equitable workforce.

#### **How do we buy your products?**

 To purchase our products, we have established multiple convenient avenues to cater to your preferences and requirements. As we embark on a significant sales expansion, there are various ways you can acquire our state-of-the-art drone components.

To initiate a purchase, please don't hesitate to contact our sales team directly. They are well-versed in our product offerings and are readily available to address any queries you may have. Whether you prefer online communication, email, or a phone call, our sales representatives are dedicated to ensuring a personalized and satisfactory buying experience.

Additionally, we offer the option for custom specifications. If you have unique requirements or specific modifications needed for your drone projects, our team of experts is ready to collaborate with you to develop custom solutions. We understand that

each application may demand tailored components, and we are committed to providing you with products that align perfectly with your needs.

**Q** What are your suggestions to youngsters who wish to choose Drone Industry as their career?

**A** To young individuals considering a career in the drone industry, I would offer the following suggestions:

First and foremost, follow your passion. The drone industry offers diverse opportunities, from piloting to engineering and data analysis. Identify what excites you the most and pursue it wholeheartedly. Passion will be the driving force behind your success and fulfillment in the field.

Next, focus on acquiring relevant education and skills. The drone industry is constantly evolving, and having a strong educational foundation is essential. Consider degrees or courses in fields like aerospace engineering, robotics, computer science, or data analytics. Additionally, gaining practical experience through internships or research will enhance your understanding and expertise.

Stay informed about regulations. Drones operate within a legal framework, and it's crucial to understand the rules and guidelines governing drone operations. Staying compliant ensures a successful and responsible career in the industry.

Building a portfolio of your work is essential. Showcase any drone-related projects, research, or initiatives you've undertaken. A strong portfolio demonstrates your capabilities to potential employers



or collaborators.

Networking is key. Attend industry events and engage with professionals and experts. Collaborating with others in the field can open up new opportunities and provide valuable insights.

Embrace a mindset of continuous learning. The drone industry is at the forefront of technology, and advancements occur rapidly. Stay open to exploring new trends, innovations, and technologies to remain competitive and relevant.

Safety should be a top priority. Always adhere to safety protocols during drone operations. Prioritizing safety not only protects others but also boosts your professional reputation.

Consider entrepreneurship. The drone industry offers ample

scope for innovative ideas and entrepreneurial ventures. If you have unique solutions or business concepts, don't hesitate to explore them.

Lastly, have a long-term vision for your career. The drone industry is still evolving, and its potential for growth is significant. Persistence, adaptability, and a passion for improvement will pave the way for a successful and fulfilling journey in the dynamic world of drones.

In summary, pursuing a career in the drone industry requires a combination of passion, education, experience, networking, continuous learning, safety consciousness, and a forward-thinking mindset. By heeding these suggestions, young individuals can position themselves for a rewarding and impactful career in this exciting field.



**Nebula Cloud**



**NebulaCloud**

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

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

**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

**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

**VECROS  
TECHNOLOGIES  
PVT LTD**



**VECROS**

Address: No 4, 2nd FLOOR, TBIU COMPLEX  
SYNERGY BUILDING, IIT CAMPUS, HAUZ  
KHAS, New Delhi, Delhi, 110016.

Email Id: prime@vecros.com  
Website: www.vecros.com  
Mobile No: 9891172241

**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

**Drone Pilots  
Network**



**DRONE PILOTS  
NETWORK**

+91 9828870101

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

**Hella Infratech**



**HELLA  
INFRA TECH**

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

089288 47575  
www.hellainfratech.com

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

**TRICAD DESIGN**



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

040 2381 7292  
marketing@tricadinfo.com  
www.tricadinfo.com

**LIGHTNING DRONES  
INDIA**  
www.lightningdrones.in

info@lightningdrones.in

**UAV  
Mapping & GIS  
Services**


TOPOGRAPHY  
SURVEY

PHOTOGRAMMETRY  
3D MAP

LIDAR 3D POINT  
CLOUD

Office: #110, A Wing, 38 Park Majestic  
Wadachi Wadi Road, Undri, Pune-411060.  
+91 9970 185 558 / +91 7020 334 149.

**Marvel Geospatial  
Solutions Private  
Limited**



**MARVEL  
GEOSPATIAL  
SOLUTIONS PVT LTD**

An ISO 9001:2015 Certified Company

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

M: +91 7995471117

info@marvelgeospatial.com  
www.marvelgeospatial.com

**JUGAPRO INDIA  
PVT LTD**



**Jugapro**

°secure °create °sustain

331, Sector 8, Imt Manesar, Gurugram,  
Haryana 122051

jugapro@jugapro.com  
www.jugapro.com

**ThinkAerial**



**ThinkAerial**

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

www.thinkaerial.com  
+91 8097739224

**HAWKING UAV**



No 43 A/4, Mount Poonamalle road, St.Thomas Mount, Chennai-600 016.

+91 44 4740 7452 / +91 99404 55484

www.hawking.in  
info@hawking.in / hradmin@hawking.in

**ASIM Navigation India Pvt. Ltd**



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

**eMap Analysis and Planning Software Pvt Ltd**



Flat No 139, Ground Floor, Shakti Khand - 1, Indirapuram, Ghaziabad -201014

cbkumar@emapspl.com  
www.emapspl.com

+91-9818174933

**INFOSTORM SPATIAL SOLUTIONS**



Flat No.4, 1st floor, Samarth Complex, Navale Hospital Road, Pune 411043

+91 88062 13333, +91 70204 57526

www.infostorm-spatial-solutions.business.site

**MAP JET SOLUTIONS**



5/8, Gobinda Mukherjee Lane Baidyabati, Hooghly-712222 West Bengal

91 7001767107

mapjetsolution@gmail.com  
www.mapjetsolution.com

**NAVIFLY**



No-33, Saraswathipuram, Behind Rashi Pride Apt, BG Road, Nyanappanahalli Bengaluru - 560 076, Karnataka, India.

www.navifly.co

**NeoGeo**  
NeoGeoInfo Technologies Pvt. Ltd.  
(Formerly known as Geoinfosys Technologies)



**NEOGEOINFO TECHNOLOGIES**

82A, 1st Floor, Udyog Vihar Phase - IV, Gurugram, Haryana - 122015

+91 8287 993 694  
info@NeoGeoInfo.com  
www.neogeoinfo.com

**KNACKFORGE**


**KNACKFORGE INC.**



102 N College, Suite 404, Tyler Texas 75702

19032661070  
sales@knackforge.com  
www.knackforge.com

**KRISHI VIMAAN**



A - 1715, Green Fields, Faridabad - 121010, Haryana

+91 98112 29551  
sg@shankargoenka.com  
www.krishivimaan.com

**AirView Robotics**



**DRONE SERVICES**

Address: V9CS+73X, Adhanur Main Rd., opp. Sai School, Urappakkam, Adhanur, Chennai, Tamilnadu-600048

OUR SERVICE

- DGCA Type Certification Assistance
- Drone documentation
- Hardware & software Tamper Proof
- Detail Drawing
- Design & Certification Consultation
- Manufacturing
- Strength Analysis
- Research & Development

Mobile: +91 9790240735  
+91 8248714551  
director@airviewrobotics.com  
www.airviewrobotics.com

**NORTH SOUTH GIS PVT LTD.**



**NSG**  
NORTHSOUTH GIS

Plot No-13, SVK Towers, Electronic Complex Extension, Kusaiguda, ECIL Main Road, Hyderabad 500062.

040 4011 9690  
info@nsgindia.co.in  
www.nsgindia.co.in

**LASTPEAK DATA**



D2, Rawdon Chambers, 11A Rawdon Street, Kolkata-700017

+91 33 22871805  
contactus@lastpeak.com  
www.lastpeak.com

**LAST PEAK**  
QUALITY. ACCURACY. AFFORDABLE.





# BUILT TO CONQUER THE SKIES

## EXPERIENCE UNPARALLELED THRUST AND EFFICIENCY

At Vector Technics, we are proud to present our cutting-edge UAV propulsion systems, meticulously designed and manufactured in India. With a relentless commitment to innovation, we have revolutionized the drone component industry, setting new benchmarks in quality, reliability, and performance.



**HIGH POWER  
DENSITY**



**REPAIR  
FRIENDLY**



**EFFICIENT**



**QUALITY**



For more information call to:  
+91 40 29330019 +91 8333901016

For Enterprise Sales email to:  
[business@vectortechinics.com](mailto:business@vectortechinics.com)

Follow us on:  
   



Scan & Order

\*Product images shown are for illustrative purposes only. Actual product design may vary.



**5TH - 7TH  
OCTOBER 2023**

**BOMBAY EXHIBITION CENTRE,  
GOREGAON MUMBAI**

**HALL NO-4**



**BOOK YOUR  
SPACE NOW**

**KEY FEATURE OF THE EXHIBITION**



**INNOVATION  
2023**

**ORGANISED BY**

**MEDIA PARTNERS**

**INTERNATIONAL ONLINE  
MEDIA PARTNER**



Founded 1973

**DRONES WORLD**

**AVIATION UPDATE**

**FIRE & SAFETY**

**RESCUE MANAGEMENT**

**LIFE SAFETY & SECURITY**

**PERSONAL PROTECTIVE EQUIPMENT**

**INDUSTRIAL SAFETY REVIEW**



**FIREWORLD**

**SAFE SECURE**

**SECURE ASIA**



**ASSOCIATED EVENTS**



**Contact Us:**

**Saurabh : +91-9350230863 | E-mail: info@droneexpo.in**

**www.droneexpo.in**



# COMMERCIAL UAV EXPO

SEP. 5-7, 2023

CAESARS FORUM / LAS VEGAS

## VERTICAL FOCUS. GLOBAL REACH.



Register at  
[expouav.com](https://expouav.com)

Use code **SAVE100**  
for \$100 off a  
conference pass or  
free exhibit hall pass

### LEARN

Expansive education program with  
**solutions-oriented presentations** & workshops  
from **UAS thought-leaders**

### CONNECT

Facilitated **networking** with drone industry  
professionals from around the globe

### EXPERIENCE

**Cutting-edge UAS solutions providers**,  
live outdoor **drone demonstrations**  
& exclusive **training**



#### THE COMMERCIAL UAV EVENT FOR:



Construction



Drone  
Delivery



Energy  
& Utilities



Forestry  
& Agriculture



Infrastructure  
& Transportation



Mining  
& Aggregates



Public Safety  
& Emergency Services



Security



Surveying  
& Mapping

Presented by: **COMMERCIAL  
UAV NEWS**

Official Association Partner: **COMMERCIAL DRONE ALLIANCE**

Produced by Diversified Communications



Asia's largest event on Civil Aviation  
(Commercial, General and Business Aviation)



**WINGS INDIA  
2024**

**18<sup>th</sup> - 21<sup>st</sup> January 2024**  
**Begumpet Airport, Hyderabad, India**

In pursuance of the Hon'ble Prime Minister's vision to fulfil the common man's aspirations of flying and the grand success of the previous edition, Ministry of Civil Aviation (MoCA), Government of India, Airport Authority of India (AAI) and Federation of Indian Chambers of Commerce and Industry (FICCI) are organizing the next edition of 'WINGS INDIA 2024', a flagship event on Civil Aviation sector in this part of the world. The event is scheduled from 18th to 21st, January 2024, at Begumpet Airport, Hyderabad, India.

Wings India 2024 will be the most comprehensive event on the Civil Aviation Industry calendar that includes the Inaugural Ceremony, Global Ministerial Conference, Global CEOs' Forum, B2B / B2G Meetings and Awards Ceremony, Cultural Evening & Business Networking Dinner. Also, the event includes Exhibition, Chalets, Demonstration flights, Static Display, Media Conferences, One-to-One Business Meetings and many more.

## Event Format

EXHIBITION



CONFERENCE



CHALETS



CEOs FORUM



STATIC DISPLAY



MEDIA CONFERENCES



AWARDS



## Exhibitors Profile

AIRCRAFT &  
HELICOPTER  
MANUFACTURERS

AIRCRAFT  
INTERIORS

AIRCRAFT MACHINERY  
& EQUIPMENT  
COMPANIES

AIRLINES, AIRLINE  
SERVICES & CARGO

MRO

SPACE & DRONES  
INDUSTRY

AIRPORT  
INFRASTRUCTURE

AIRCRAFT ENGINE  
MANUFACTURERS

SKILL  
DEVELOPMENT

## Contact Details

**Mr. Nachiket Basole**

Deputy Director

M: +91-9867312834

E: nachiket.basole@ficci.com

**[www.wings-india.co.in](http://www.wings-india.co.in)**