DRONES WORLD

India's first bi - monthly E magazine for Drones

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Lt Col V S Velan
CTO, Elena Geo Systems

In Conversation with
The Drone Guru
Col Ravi Bandreddi

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Contact Person:

Mukesh Kharia

+91 8285009906

mukesh@nexgenexhibitions.com

contents

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Editor-in-Chief : B. Kartikeya

EDITORIAL

Associate Editor : Rohith Reddy

DRONE CORRESPONDENTS

Prakash Tirandas

B. Ravi

Rahul Verma

CREATIVE HEAD : Rajesh Bali

PHOTOGRAPHER : Krishanth

MARKETING

Manager : Naheda Imtiyaz
(North & West)

Manager, Marketing : Rohith Reddy

For Europe Advertisements:

Jubin Josepsh
Tel : +33 758933925
jubin.joseph@bluespacegroup.com

SUBSCRIPTION : Sony

Editiorial & Advertising Offices

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

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Hello my dear Readers,

Welcome to yet another edition of Drones World, India's first ever bi-monthly magazine that offers a closer perspective of all things on or about Drones Industry.

In this issue, we have covered the essential bits of global news, innovations, Acquisitions, trails & new products. The special Interview with Mr Eric Freeman of this edition is on unique unmanned helicopters designed, developed and manufactured by Alpha Unmanned Systems in the Madrid.

Don't miss out reading out our exclusive Interviews with two Industry Veterans. Mr Col Ravi Bandreddi feels "For a start-up," "three things are required — talent, capital and ecosystem." While there is no dearth of talent, and 'capital' is now more accessible, it is the ecosystem that is still deficient. Another Wonderful conversation with Mr. Lt Col V S Velan CTO of Elena Geo Systems who is subject matter expert in Satellite-Based Navigation recently launched the India's first, NavIC Drone Navigation Unit (NDNU) says "We need to develop drone talent in India. Just like India developed IT talent for the world."

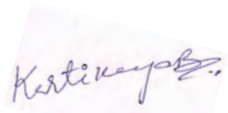
It's a boon for Drone Startups to showcase their abilities and capabilities to attract investors and governments around the world. We wish to see the whole unmanned industry as the winner of the decade & it's the need of the hour to save our lives and the world in the present and future.

Our Next Issue focus will be on Type Certification – Process and Challenges, we will be happy to receive opinions/suggestions/feedback on Type Certification from academicians, manufactures, solution providers from India.

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

Till then, stay safe, God bless.

Thanks



B. Kartikeya
Editor

FAA Approves Airworthiness Criteria for Wingcopter, Marking Important Milestone in U.S. Type Certification Process

German drone delivery pioneer Wingcopter is delighted to announce that the Federal Aviation Administration (FAA) has issued the Special Class Airworthiness Criteria for the Wingcopter 198 US unmanned aircraft. This approval marks a critical milestone in the certification process of Wingcopter's flagship eVTOL delivery drone in the U.S.

With the Airworthiness Criteria, the FAA defines technological requirements under title 14, Code of Federal Regulations (14 CFR), § 21.17(b) that must be met to have an aircraft type-certified for regular commercial operations in the U.S.

Besides its efficient design for commercial and humanitarian delivery missions, the Wingcopter 198 was engineered from the ground up to meet stringent safety standards. In the development, Wingcopter was able to leverage the operational experience of more than five years with the company's first delivery drone type in various geographical settings, from the Arctics to the Middle Eastern desert and from remote islands in the South Pacific to San Diego Bay in the U.S.

Since applying for the Special Class Type Certificate in March 2020, Wingcopter has collaborated closely with the FAA. The issuance allows Wingcopter to focus its development efforts even more on what the FAA deems necessary for this particular aircraft to receive certification quickly and efficiently.

"We are proud to be among the first delivery drone companies worldwide to ever get their Airworthiness Criteria approved by the FAA. This is a very important milestone for us, not only in our Type Certification Process in the U.S., but also for our international expansion efforts and for achieving our vision of building logistical highways in the sky. I would like to thank my team as well as the FAA for all the effort and great collaboration to reach this milestone", says Tom Plümmer, Co-Founder and CEO of Wingcopter.

Once type-certified, Wingcopter will be able to fly conventional routes through airspace and over populated areas, ultimately providing the basis for scaling commercial drone delivery operations across the U.S. that will help save and improve lives. The certification is expected to also have a positive impact on Wingcopter's further certification efforts such as with ANAC in Brazil or JCAB in Japan.

Union Aviation Minister awards the first Type Certificate under Drone Rules, 2021 to Gurugram-based IoTechWorld

Shri Jyotiraditya M. Scindia, Union Minister of Civil Aviation awarded the first Type Certificate (TC) under Drone Rules, 2021 to IoTechWorld Avigation Pvt Ltd. The Gurugram based company was established in April 2017 and is one of India's leading manufacturers of Kisan drones.

IoTech has received the Type Certificate in barely 34 days after submission of its online application on the DGCA's DigitalSky Platform on 11 May 2022. This is despite the fact that the Drone Rules, 2021, allow 60 days to Quality Council of India (QCI) or the Certification Bodies (CB) and 15 days to DGCA for issuing the Type Certificate (i.e. 75 days in total), provided all the necessary documents and test reports are as per specifications.

The Drone Rules, 2021 were notified on 25 Aug 2021 and the 'Certification Scheme for Unmanned Aircraft Systems (CSUAS)' for obtaining Type Certificate (TC) for drones was notified on 26 Jan 2022.

There are three globally-renowned Certification Bodies (CB) approved by QCI namely – TQ Cert, UL India and Bureau Veritas. Drone manufacturers are free to approach any Certification Body for testing their drone prototype.

The drone certification scheme of January 2022 was developed by the Quality Council of India in consultation with drone startups, industry, academia and defence experts. The Government played the role of that of a facilitator and problem solver.

The drone certification scheme is likely to create an eco-system for world class drones to be manufactured in India and sold all across the world. There are 14 drone prototypes that are currently undergoing the certification tests. The number of Type Certified prototypes may exceed 100 over the next three years.

Speaking on this occasion, Shri Jyotiraditya M. Scindia congratulated IoTechWorld Avigation Pvt Ltd for the first Type Certificate (TC) under Drone Rules, 2021. He said that Ministry of Civil Aviation is working in the direction of Hon'ble Prime Minister's vision "Minimum Government, Maximum Governance". India has set a target to become a drone hub by 2030 and issuing of type certificate in record 34 days is a step in that direction. The other drone prototypes shall also be awarded certification soon, he added.

We're Bringing the Convenience of Drone Delivery to 4 Million U.S. Households in Partnership with DroneUp

We continue to expand our delivery operations to help customers get the items they need when they need them, and it's been an exciting journey. From Express delivery, where customers can have items delivered to their doorsteps in as little as two hours, to InHome, where they can get those orders placed right into their refrigerators, we're proud to offer customers multiple options that help them save time and money.

One solution we've been working on over the last year is delivery via drone. Today we're announcing we'll be expanding our DroneUp delivery network to 34 sites by the end the year, providing the potential to reach 4 million U.S. households across six states – Arizona, Arkansas, Florida, Texas, Utah and Virginia. This provides us the ability to deliver over 1 million packages by drone in a year.

Between the hours of 8:00 a.m. and 8:00 p.m., customers will be able to order from tens of thousands of eligible items, such as Tylenol, diapers and hot dog buns, for delivery by air in as little as 30 minutes. For a delivery fee of $3.99, customers can order items totaling up to 10 pounds, so simply put, if it fits safely it flies.

After completing hundreds of deliveries within a matter of months across our existing DroneUp hubs, we've seen firsthand how drones can offer customers a practical solution for getting certain items, fast. More importantly, we've seen a positive response from our customers that have used the service. In fact, while we initially thought customers would use the service for emergency items, we're finding they use it for its sheer convenience, like a quick fix for a weeknight meal. Case in point: The top-selling item at one of our current hubs is Hamburger Helper.

Participating stores will house a DroneUp delivery hub inclusive of a team of certified pilots, operating within FAA guidelines that safely manage flight operations for deliveries. Once a customer places an order, the item is fulfilled from the store, packaged, loaded into the drone and delivered right to their yard using a cable that gently lowers the package.

The customer has always been at the center of our focus at Walmart, and we look for partners that are as laser-focused on customer experience as we are. DroneUp has been a reliable partner as we've tested this solution and their capabilities will enable our business to scale with speed while maintaining a high caliber of safety and quality.

But Walmart packages aren't the only thing the drones will deliver. A core value at Walmart is to give back to the communities in which we operate, which is why as we scale our drone infrastructure, we'll continue to influence the expansion of drone technology and enable other businesses to explore its benefits, too. This means DroneUp will offer local businesses and municipalities aerial drone solutions in areas like insurance, emergency response and real estate. For example, a local construction agency can work with DroneUp to monitor on-site job progress through aerial drone photography.

Not only will the added revenue help offset the cost of delivery, but it also serves the entire drone industry by gathering more flight data as we work together to expand drone operations in a safe and regulated way.

Our founder Mr. Sam once said, "I have always been driven to buck the system, to innovate, to take things beyond where they've been." We're doing just that with drone technology, making it a feasible solution that we know customers and communities will enjoy.

Indian drone start-up Garuda Aerospace to set up plant in Malaysia

Garuda Aerospace Pvt. Ltd. will set up a production facility in Malaysia at an outlay of Rs 115 crore.

"We have decided to set up a drone production facility in Malaysia with a production capacity of about 50 drones per day. We will be importing the components from India and other countries," Agnishwar Jayaprakash, Founder & CEO of Garuda Aerospace.

"This partnership will define an ecosystem of drones with advanced artificial intelligence, machine learning, and deep learning technologies," Jayaprakash said.

He clarified that the partnership is not a joint venture with two companies sharing the equity capital. The Malaysian company will enable Garuda Aerospace to set up the plant and other business prospects, he said.

The city-based company has tied up with HiiLSE Global Sdn Bhd (HiiLSE Drones), a drone start-up in Malaysia. HiiLSE Drones founder and CTO, Shanmugam S. Thanggavilo said that a drone plant in the region would create 3,000 new jobs centered around drone expertise.

Garuda Aerospace is in the process of raising USD 30 million and it will close this July, Jayaprakash said.

IdeaForge and Ingram Micro India have signed a drone distribution agreement

IdeaForge has announced a distribution agreement with Ingram Micro India to expand its global distribution network. Ingram Micro will distribute idea Forge's portfolio of world-class drones under this agreement, ensuring that UAVs deliver consistent results across major applications.

Ingram Micro is a global leader in delivering a full spectrum of global technology and supply chain services to businesses around the world. With its deep expertise in technology solutions, mobility, cloud, and supply chain solutions, it enables its business partners to operate efficiently and successfully in the markets they serve. The in-house capabilities of ideaForge have given the design team the flexibility and agility to develop the product line in close collaboration with the end-user, ensuring that the resulting solutions meet the customer requirements.

Ankit Mehta, Co-Founder & CEO, ideaForge, said, "We are highly enthused to team with Ingram Micro. The first of its kind collaboration for Ingram Micro to expand our global distribution network is a significant step forward for our company and the entire UAV ecosystem. As an Indian drone pioneer, ideaForge designs and manufactures world-class field-proven drones that can operate even in extreme temperatures and terrains for security, surveillance, and mapping applications. Ingram Micro's skilled team, extensive distribution network, and specialised inventory planning framework will help ideaForge scale up its distribution across the globe and contribute to Hon. Prime Minister's vision of making India a Global Hub for Drones."

On this new agreement, **Navdeep Narula, Executive Director, Mobility, Compute and IoT at Ingram Micro India**, said, "At Ingram Micro, our partners play an instrumental role while working closely with end customers. We are excited to engage in our distribution relationship with ideaForge. This strategic collaboration will help us to deliver superior results with high performing drones in the UAV ecosystem. Enabling operators to investigate questionable things and circumstances without endangering their security or welfare by getting real-time data on issues such as area surveillance and public safety monitoring makes them an extremely versatile system that can accomplish a wide variety of tasks. With our substantial distribution network, we will drive the adoption of UAV in India to maximize the impact in enhancing productivity and security for our customers."

Phenix Solutions completes FAA milestone

Phenix Solutions Inc. has completed a significant FAA milestone to continue their Type Certification (TC) journey for the Ultra 2XL remote piloted UAS. Recently, the FAA accepted and reviewed Phenix's Project Specific Certification Plan (PSCP) and provided the project number TC17844LA-R to the Ultra 2XL program.

The goal for the Ultra 2XL continues to be FAA TC. With the receipt of the FAA TC, operators can now leverage the safety advantages and enhanced performance of the Ultra 2XL to execute commercial operations. Dan Wright, Director of Airworthiness and Certification, mentioned, "The Phenix team has been focused on implementing the processes and procedures required to obtain a TC and Production Certificate (PC) throughout the build process of the Ultra 2XL. The processes and procedures our team has developed are the core competencies enabling us to certify and manufacture a safe, high performing aircraft within the established regulatory framework."

The Phenix team is comprised of aviation professionals with multiple decades of experience working with the FAA and Foreign Aviation Authorities certifying many products for worldwide use. Brian Riese, President and CEO, stated, "Our seasoned certification team led by Daniel Wright, has been in open communication with the FAA since the beginning of the development of the Ultra 2XL. We have a clear certification path for Ultra 2XL within the FAA TC process and the Military Flight Release (MFR) and Airworthiness processes. The FAA has been a tremendous partner during this process, and these approvals show that we are heading in the right direction."

SwissDrones granted European Drone Operator License (LUC)

SwissDrones, a global manufacturer of long-range unmanned helicopter systems, has obtained their European drone operator license, the EASA Light UAS Operator Certificate (LUC) in accordance with European Regulation (EU) 947/2019, granted by the Transport Malta Civil Aviation Directorate (Transport Malta), the country's Civil Aviation Authority.

This is the first LUC issued by Transport Malta, and the sixth issued in Europe. The certificate allows SwissDrones to self-authorize flight operations of its SDO50 V2 unmanned helicopters across EASA countries, including beyond visual line of sight (BVLOS) operations within the limits of the certificate. It is the highest authorization achievable under European drone regulations.

"It has been a pleasure working with our counterparts at Transport Malta," said Arangan Varatharajah, Head of Flight Operations at SwissDrones. "They have been very professional and supportive throughout the application process, and we look forward to our continued collaboration as we expand our activities in Malta and beyond."

Dr Analiza Abdilla, UAV Flight Operations Inspecting Officer at Transport Malta, said "We are pleased to be issuing our first LUC certificate to SwissDrones, with whom we have been working closely over the past months towards achieving this milestone. They have demonstrated a highly professional approach throughout the entire process and we look forward to further supporting the development of their operations within and beyond the Maltese islands."

SwissDrones plans to perform ongoing BVLOS flight testing campaigns in Malta, given the ideal geographical environment with ample airspace for long-range testing in real-life conditions, including in coastal areas and over the ocean. Additionally, the nation is a growing hub for unmanned aviation with a dedicated support infrastructure and a clear governmental commitment to advance this high-growth industry.

Propeller Aero and Quantum-Systems Partner to Provide PPK Support for Trinity F90+ Drone in a Win for Large Site Surveying

Propeller Aero, the drone data visualization and analytics platform, and Quantum-Systems, the Unmanned Aircraft Systems developer, today announced their joint effort to include compatibility of Propeller's site surveying and 3D mapping software with Quantum-Systems' Trinity F90+ drone.

Propeller's Post-Processed Kinematic solution (PPK) enables seamless surveying and 3D mapping of worksites across the construction, mining and earthworks industries. Coupled with Quantum-Systems' Trinity F90+ drone, a dedicated large scale mapping drone, contractors will be able to improve survey accuracy, condense their traditionally weeks-long data collection process into a few hours, and quickly share digital models among their broader worksite teams.

Designed and manufactured in Germany, the Trinity F90+ drone builds on Quantum-Systems' previous F9 model and makes electric vertical take-off and landing (eVTOL) aircraft accessible to customers at an affordable price point without compromising technical quality or usability. Additionally, the Trinity F90+ drone can fly for up to 90 minutes – well beyond the industry standard of 60 minutes – allowing earthworks professionals to survey larger worksites more efficiently, and it comes with the broadest choice of integrated sensors in the industry.

"Today's contractors and surveyors are eager to adopt new technologies that modernize workflows and allow them to analyze more aspects of their worksite than ever before," said Richie Hadfield, Head of Product at Propeller Aero. "The clients we work with are doing cutting-edge work in the construction, earthworks, and mining space and are already using drone technology to accelerate project timelines, reduce costly rework, and create safer environments for their employees. Our new partnership with Quantum-Systems gives our customers in Europe and around the world even more ways to achieve this increased efficiency and accuracy with the highly advanced F90+ drone."

To use the combined solution, surveyors place Propeller AeroPoints™ (smart ground control points) around the worksite, fly the Trinity F90+ drone above to collect survey data and upload that data to Propeller's cloud-based platform where it is processed and available to use within 24 hours.

"The drone industry has progressed a lot over the last couple of years, along with customer expectations," notes Florian Seibel, Co-founder and CEO of Quantum-Systems. "It is no longer reasonable to have customers figure out a complete solution for their needs. As a technology company, we listen to our customers and understand their needs and how best to address them. With the full Trimble Stratus solution completed with Trinity F90+, customers can proactively finish their projects from end to end."

FAA Certifies New Sagetech Avionics Mode S Micro Transponder with Integrated ADS-B In and Out

Sagetech Avionics Inc., a U.S. aerospace technology company providing industry-leading situational awareness solutions for crewed and uncrewed aerial systems announced that the U.S. Federal Aviation Administration (FAA) issued the technical standard order (TSO) of the MXS, Mode S Transponder with integrated ADS-B In and out.

Sagetech's next-gen MXS miniature transponder provides Mode A, C, S and 1090 MHz ADS-B In/Out and is suitable for use worldwide by crewed or uncrewed systems. In addition, each transponder comes with user-friendly command and control software with a built-in traffic display for situational awareness or can be used plug and play with PX4 and Ardupilot based Autopilots. The MXS is the ideal transponder for improving aircraft visibility and safety, especially when small size and low power consumption are critical.

The MXS is the first FAA-certified small transponder to have an integrated ADS-B In receiver, and is the first small, certified ADS-B receiver in the world.

Key Features:

Unprecedented micro-SWaP

Full diversity

1090 MHz ADS-B In/Out

Flexible I/O – RS232, RS422, Ethernet

One box solution including ADS-B In/Out

"The MXS provides uncrewed and crewed aircraft OEMs with exciting options they didn't have before, and as usual, our engineers have broken new ground with these TSOAs," said Tom Furey, CEO of Sagetech Avionics. "Certification means safety and trust, to know that you will reliably detect all 1090 MHz ADS-B traffic."

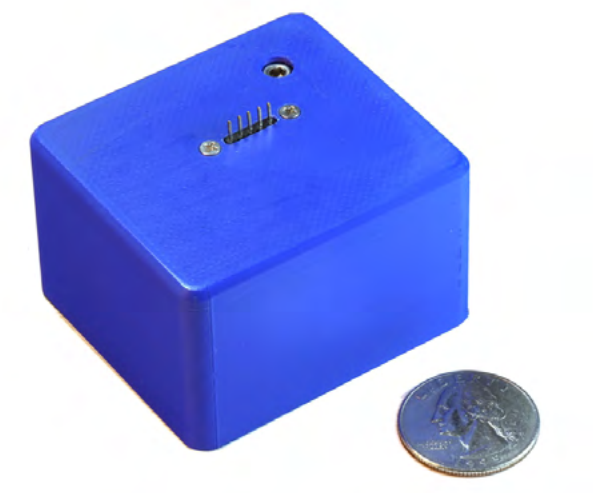
Since Sagetech's MXS and the MX12B DoD-certified military IFF transponder share a common hardware platform, the MX family represents the only logical solution for an OEM positioning their aircraft in both the civil and military markets. UAS providers can simply install the MX12B for their military customers, or swap it out with an MXS for their civil customers: no additional-integration, no software changes, no aircraft changes. "It's a truly elegant solution," said Furey.

Miniature Triple-Axis Unit Developed

Following the great interest for our world's smallest and most lightweight fiber optic gyro VG221, as well as the compact and light three-axis gyroscope G181, we have developed a new triple-axis unit G121. It is based on the VG221-like sensors and inherits such outstanding parameters as:

lowest SWaP – 52x58x37 mm, 125 gram, 2 Watt
low noise performance – 0.025 °/√h
instant initialization – 1 sec.

The G121 is equipped with an RS422 output (921,6 kBd baud rate, 4.8 kHz data rate). Learn more in the full datasheet.



Ascent AeroSystems Spirit Platform Joins DIU Blue UAS Approved List

The Defense Innovation Unit (DIU) announced that Ascent AeroSystems "Spirit" platform has been added to the Blue UAS Cleared List of approved small unmanned aerial systems (UAS). Beginning immediately, any U.S. government customer can buy and operate a Spirit without further technical manufacturers can quickly get systems into the field where they're needed.

"We've been shipping Spirits since 2020, and our customers worldwide have come to appreciate the rugged versatility it delivers," said Paul Fermo, VP of Business Development. "We're pleased that government and municipal customers will now be able to get the systems they need with a few mouse clicks."

The DIU Blue UAS program was established to provide a comprehensive vetting process for selected unmanned aerial systems. By eliminating duplicate approval processes across various branches of the government and defense agencies, operators and

"Government agencies can't pick and choose when and where they fly," said Peter Fuchs, CEO. "The Spirit's coaxial configuration delivers the compact, high performance, all-weather capability needed for those mission-critical applications. Its modular design allows operators to not only configure it exactly as it's needed for the mission at hand, but easily adapt new sensors as they become available."

The company has Spirits currently available for immediate delivery, and delivery positions are being accepted for additional units slotted for shipment beginning in August.

Hyderabad-based Crystal ball got India's first type certified mapping drone - Model V

What if I tell you that it's now possible to

- Reduce field time and survey costs,
- Map high-resolution 3D models of areas otherwise inaccessible,
- Carry out surveys and process and deliver data in no time.

This is all possible with India's only drone which is type certified for Mapping & Survey, Agriculture Surveillance and Healthcare.

Presenting Model V, first type certified mapping drone by Crystal ball. We are more than a company, we are a team of innovators. And here is why Model V is different!

Model V is built of carbon fibre along dual parachute recovery systems so that it can

harness actionable intelligence from aerial data and secure your investment.

Our work doesn't stop at building drones. We understand our customer's problems and also help them do the survey, process raw data and give them the final output required for their projects.

Crystal ball is an end to end solution for Mapping & Survey, Agriculture Surveillance and Healthcare. Crystal ball, a global start-up company with its headquarters in California, US and offices in India. In India, we are incubated by IIT-Hyderbad for innovation, new technology and R&D purpose.

Flyability releases the Elios 3, an indoor LiDAR drone for Industry 4.0

Flyability, the Switzerland-based maker of the popular Elios range of drones for indoor and confined-space inspections, is ready with its next offering: Elios 3. It's the world's first collision-tolerant drone equipped with a LiDAR sensor for indoor 3D mapping.

Elios 3 is powered by Flyability's new proprietary simultaneous localization and mapping (SLAM) engine called FlyAware. A combination of computer vision, LiDAR technology, and NVidia graphic engine, FlyAware acts as a centimeter-accurate indoor GPS for the drone, building real-time 3D maps and enabling the aircraft to sense its surroundings accurately.

Flyability says its plan is to make complex confined-space inspections completely autonomous in the future using FlyAware. But for now, the company is introducing the new Inspector 4.0 software which can be used to visualize Points of Interest found during an inspection in a high-resolution 3D map. Meanwhile, these survey-grade 3D models are being made possible using software from Flyability's new partner, GeoSLAM.

"The Elios 3 is the single biggest project that Flyability has ever undertaken," said Adrien Briod, CTO of Flyability. "If you think of the Elios 2 as your classic flip phone, only designed to make phone calls, the Elios 3 is the smartphone. It's made to be customized for the specific demands of each user, letting you attach the payload you need so you can use the tool as you like, and allowing it to grow and improve over time with new payloads or software solutions."

"The Elios 3 has some of the very best stabilization in the world, a modular payload, the ability to create 3D models in real time while in flight, and it paves the way towards an increasingly autonomous future," said Patrick Thévoz, co-founder and CEO of Flyability. "For industrial inspections, the Elios 3 is a key enabler of Industry 4.0, presenting an inspection solution that can make inspections safer, more efficient, and less expensive than ever before."

FIXAR announces new autonomous long-range eVTOL FIXAR 025.

The full-stack European drone developer FIXAR introduces an autonomous full-electric drone FIXAR 025 designed for large-scale missions for commercial and industrial applications.

The FIXAR 025 carries up to 10 kg (22 lbs) payload for a distance of up to 300 km (186 mi) in one battery charge. The operations are fully autonomous assured by an in-house developed next-generation Autopilot and xGroundControl systems making it an efficient and reliable choice for BVLOS missions.

Long-anticipated increased flight distance and payload capacity have been unlocked and supplemented with versatility. The UAV allows to use broad array of sophisticated professional payload modules by easily swapping them and using the same aircraft for surveying, aerial imaging, remote sensing, surveillance, real-time monitoring and delivery.

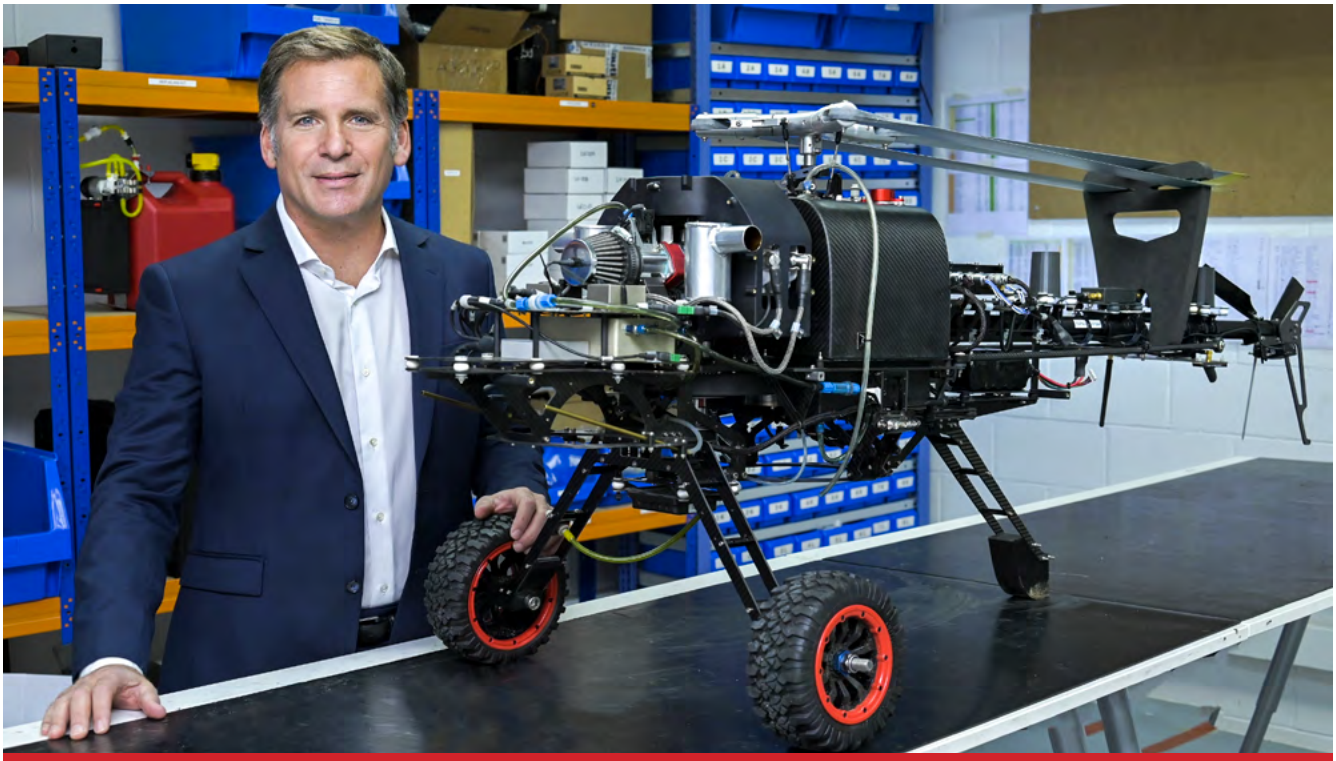
The UAV is equipped with a patented payload safety system to secure the sensors and the data backup BlackBox system for mission and payload data safety.

"With this model, we intend to answer a lasting market call for the increased flight range, payload capacity, and integration vastness. FIXAR 025 has a full-body lift design, the entire body of the UAV serves as a wing area, eliminating dead weight and increasing flight efficiency and length," says Vasily Lukashov, Founder & CEO at FIXAR.

"The system comes with an API compatible with any unmanned air traffic management ecosystem regardless of the country of operations. This allows to easily comply to the air traffic authority rules, fulfill safety requirements and start missions at any location in no time," he adds.

It is currently possible to pre-order the drone; the serial production for the FIXAR 025 will begin by the end of 2022.

Get to know FIXAR 025.



Drones World In Conversation with Mr. Eric Freeman, Founder and CEO, Alpha Unmanned Systems

Could you brief our readers about Alpha Unmanned Systems and your role in leading it?

Alpha Unmanned Systems (AUS) is a company 100% Spanish leader in the design and manufacture of unmanned fuel-powered small tactical helicopters. It designs two very reliable and versatile flight platforms, both of which are less than 25kg and fly between 2-4 hours with up to 4kgs of payload. The possible applications and services that Alpha's drone helicopters can offer are very varied: from agriculture, mining, surveillance, maritime, industrial inspections, rescues and many more.

Our offices are in Madrid, Spain and we have teams that travel globally with our UAV helicopters for events, testing, pilot training, customer maintenance, etc....

Madrid is one of the best areas in Spain for experimental drone flights, well-educated engineers and many Airbus-related suppliers.

Our company has customers currently in 8 countries, on three continents.

I am co-founder and CEO of AUS since 2014, managing the company's business development efforts and strategic direction with the crucial support of a team of over 20 talented people, among them top-notch engineers and aeronautic specialists.

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

Before starting AUS some eight years ago, I raised venture capital funding, staffed and managed 2 start-ups and worked with more than 10 others. I consider myself an expert in strategic marketing and in international business development with a focus on building corporate alliances that create strategic value while driving revenue. I understand the challenges that start-up companies face and the need for organizational infrastructure to support and adapt to rapid growth.

While I am currently immersed in new technologies and surrounded by engineers, I originally studied History at Trinity College in Hartford, Connecticut followed by an MA in Spanish Civilization from New York University and an MBA from UCLA in Los Angeles. Because of my work, I travel extensively and love the challenge of introducing new technologies in a meaningful way. I am a reasonable cook and a proud father to a wonderful daughter.

Speaking of your product Alpha 900/800, could you elaborate its specifications, capabilities and the possible modifications?

Our state-of-the-art Alpha 900 UAV model is was designed and developed in-house, with significant input from the world's largest defense companies and end-user clients. This is a 25kg fuel-powered helicopter that can take off vertically from a moving vessel and land autonomously on it, requiring a small logistical footprint for these two essential operations. It can also fly relatively longer flight times compared to other similar-sized UAVS. With a powerful combustion engine that uses gasoline or heavy fuel, it gives great autonomy (up to 4 hours) and can carry payloads of up to 4 kgs. It is built "Stanag Compliant" meaning that all critical systems are redundant. This makes it a very good technology for many navies, coast guards, and/or seaborne intelligence, surveillance, target acquisition, and/or reconnaissance operations.

The A900 is the result of more than 3 years of research, tests and flights based on our original A800 platform, though with increased dimensions and capabilities.

Navies around the world, coast guards, and others have recently shown an increased interest in UAVs for maritime security and critical surveillance missions. For example, more monitoring is being required due to increased migration through the Mediterranean and at key nodes such as straits, ports, and nuclear installations. Naval units and the use of UAVs onboard can provide deployable capabilities that deliver fast and accurate information.

To your question about possible modifications for this particular UAV, the A900 is a very flexible and adaptable helicopter that allows for multiple models of optical payloads and cargo platforms. Its design is also very flexible regarding the needs and specific requirements of each customer we serve.

Enlighten us on the UAV markets in Europe and the Indian regions. How do they compare against each other?

This is a great question that is difficult to answer as we do not have experience in the Indian

regions. End-users worldwide, from coast guards to navies, customs organizations, police and border control all need reliable platforms that can fly more time and carry multiple types of payloads. By focusing on maritime security with the Alpha 900, we are confident that there are more similarities than differences with our customers worldwide- all of which require and demand systems that work. Most of these organizations are looking to test UAV technologies and if they continue to do so and work with manufacturers like Alpha, they will ultimately help shape and ensure the availability of ever-easier to use reliable platforms that can fly many different sensors and deliver real-time data securely.

What is Alpha Unmanned Systems level of participation in AUVSI Xponential 2022?

We took the opportunity to participate in this year´s edition of Xponential 2022 in Orlando to present our flagship product, the Alpha 900 UAV helicopter. Considered one of the most important events in the UAV sector in the world and a great showcase for the North American market, Xponential brings together the leading companies in the industry. It was a great moment for us to participate in this year´s in-person format in which both exhibitors and the general public attended in large numbers.

A team of engineers from AUS and I personally traveled to Florida to present the new helicopter, network with industry experts and respond to the many inquiries we had from clients and prospects. Overall, it was a very productive and engaging experience.

As a Managing Director, what are your plans for the expansion of Alpha Unmanned Systems both in terms of products and the business?

The future of our company is definitely oriented to reach a global market in a global economy. Although we currently have many clients in Spain and the European Union, AUS is increasingly focusing its sales and marketing efforts on other important and promising markets around the world. The Asia region and North America have become hot spots for our products, but we also see a promising future in developing economies both in Latin America and Africa.

As an example of our international orientation, we are currently participating in ResponDrone, a project funded by the European Union under the H2020 program. Its main objective is to create a technological platform that allows emergency teams (firefighters, police, civil guard, civil protection, UME...) to improve the situational awareness they have in emergency situations, as well as to gather the necessary information faster and improve communication and collaboration between the parties involved.

Alpha brings to this project its fleet of UAVs and ground control stations. Alpha's drones are especially versatile and suitable for emergency situations, due to their high autonomy (up to 2:30h for the A800 and 4 hours for the A900), payload capacity (up to 2.5kg for the A800 and up to 4kg for the A900) and operating range (greater than 50km radius). All this is possible thanks to the use of fuel-powered engines, which also allow for minimizing downtime by fast refueling. It even permits the use of payloads that consume higher amounts of energy as an onboard generator and our own Power Control Module power all electronics.

In addition, we recently announced the incorporation of Joseph Menaker, co-founder and CEO of UAV Factory (now EDGE Autonomy) to Alpha´s Advisory Board. With over 30 years of high-tech industry experience, he will provide Alpha with deep managerial and industry knowledge. We look forward to learning lots from Joseph and from his extensive network of contacts in the industry. Joseph has excellent experience with the target markets of our new Alpha 900 and we are confident that we can execute even better and grow even faster with his insight and support.

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

Absolutely! While multi-copters, VTOLS and fixed-wing UAVs all have plenty of use cases, no other platform resists wind and light rain better than a traditional helicopter format. Our helicopters can hover for 1-2.5 hours and none of these other systems can do this today. Further, fuel-powered engines provide greater flight autonomy gram/gram compared to electric systems and can be refuelled faster than the rest. Payload capacity is also greater than VTOLs and more sophisticated and power-intensive payloads can be used thanks to the onboard generator.

While we like electric-powered systems, and I actually own an electric car, when I really have important distances to travel and important work to do, I'd prefer a fuel-based car any day. This is why our motto at Alpha Unmanned Systems is, "UAV Helicopters for Hard Work."

FLIR Wins Additional $15.4M Contract for Black Hornet Nano-UAV Systems for U.S. Army Soldier Borne Sensor Program

FLIR Systems announced it has won an additional $15.4 million contract to deliver its FLIR Black Hornet® 3 Personal Reconnaissance Systems (PRS) to the U.S. Army. The advanced nano-unmanned aerial vehicles (UAVs) are being used to augment squad and small unit-level surveillance and reconnaissance capabilities as part of the Army's Soldier Borne Sensor (SBS) program.

In late 2018, the U.S. Army began acquiring Black Hornet 3's to support the SBS effort. Since then, it has placed orders totaling more than $85 million for the FLIR nano-UAV.

Extremely light and well suited for operations in contested environments, 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. Its information feed provides soldiers with immediate covert situational awareness to help them perform missions more effectively. FLIR has delivered more than 12,000 Black Hornet nano-UAVs to defense and security forces worldwide.

"Unmanned systems like our Black Hornet provide enhanced standoff and safety to troops in harm's way, which is critical as militaries intensify their plans for multi-domain operations," said Roger Wells, VP and general manager of Unmanned Systems & Integrated Solutions at FLIR. "We're honored the Black Hornet plays an integral part in the Army's Soldier Borne Sensor program. Every new order is a testament to the difference this technology can make on the battlefield and renews our commitment to advancing the science."

UAVOS Expands Helicopter Rotor Blade System Capability to Add Torsion Bar

UAVOS announced that it had completed flight tests of its advanced bearingless rotor system installed on the UVH 25EL unmanned helicopter. Torsion bar is aimed to provide an effective damping action against the dynamic components of the forces and torques acting on the rotor. The new rotor design has resulted in increasing Time between Overhauls (TBO) and therefore in low life-cycle costs, better hub design, and superior handling qualities. Torsion Bar for a main helicopter rotor is designed to be mounted on a helicopter with maximum takeoff weight of 50 kg.

In helicopters, the main rotor system is a critical element. To overcome many of the problems associated with the pitch bearing rotor systems, and improve the efficiency and capabilities of aircraft, many rotorcraft companies are using articulated rotors. A key element in the design of a bearingless rotor is the flexbeam. To reduce hub drag and weight, it is created light and compact and designed for centrifugal force and large elastic deflections.

UAVOS designs advanced composites rotors which feature superior fatigue characteristics, their higher stiffness- to-weight properties, their flexibility in tailoring structural characteristics, and their potential to lower production and operating costs.

"The primary purpose of the tests is to shake out the new helicopter's rotor system strength and measure its dynamic characteristics while the aircraft is flying,'' said CEO at UAVOS Aliaksei Stratsilatau. "The system performed extremely well over a variety of forward flight conditions as well as maneuvering up to 100 km/h. We are making great progress, and in the meantime are keeping our interested customers keenly aware of the exceptional performance that UAVOS aircraft equipped with a reliable rotor system will bring."

GA-ASI Grows Mojave Line with New MQ-9B STOL Package

To further extend the versatility of its MQ-9B line of Remotely Piloted Aircraft, General Atomics Aeronautical Systems announced that it will begin developing a short takeoff and landing (STOL)-capable MQ-9B aircraft, which includes the SkyGuardian® and SeaGuardian® models. GA-ASI is taking on this revolutionary engineering effort to meet an evolving operational environment in contested expeditionary environments.

GA-ASI began STOL development in 2017 as part of its Mojave initiative. STOL capability was initially flown on a modified Gray Eagle Extended Range platform in 2021, but now the company will begin developing STOL on the MQ-9B, a platform already selected by the Royal Air Force, the Belgium Ministry of Defence and the Japan Coast Guard. MQ-9B STOL will combine GA-ASI's proven long-endurance, highly reliable UAS products with the versatility to execute missions in more austere locations, opening the operational envelope for commanders across all Services and geographic locations.

The MQ-9B STOL configuration will consist of an optional wing and tail kit that can be installed in less than a day. The core aircraft and its sub-systems remain the same. Operators can perform the modification in a hangar or on a flight line, delivering a capability that otherwise would require the purchase of a whole new aircraft.

"Imagine taking the hard top off your Jeep. You lift it off, stow it in your garage and now you've got an open vehicle. If it rains, you put the hard top back on. We're the same. Take a standard MQ-9B, put the STOL kit on, and then go fly," said GA-ASI President David R. Alexander.

The Israel Ministry of Defense will begin testing a robotic unmanned vehicle (M-RCV Medium Robotic Combat Vehicle)

The robotic combat vehicle will be unveiled at Elbit Systems' pavilion at the Eurosatory Defense and Security Exhibition. The vehicle includes a new robotic platform *type BLR-2 made by BL*, a 30 mm autonomous turret developed by the Tank and APC Directorate for the 'Eitan' APC, Elbit's 'Iron Fist' Active Protection System, fire control and mission management systems, and robotic autonomous kit, in addition to situation awareness systems. The vehicle also features a capsuled drone for forward reconnaissance missions, and a passive sensing kit developed by Elbit Systems and Foresight.

The technological demonstrator, led by the Ministry of Defense's DDR&D and the Tank and APC Directorate, integrates a number of cutting-edge technologies including advanced maneuvering capabilities, the ability to carry heavy and varied mission loads, and a built-in system for transporting and receiving UAVs.

The vehicle will also incorporate sights, an IAI missile launcher, and Rafael Advanced Defense Systems' 'Spike' missiles. The M-RCV's capabilities include a highly autonomous solution for forward reconnaissance, and controlled lethality in all-terrain conditions. It is operational during the day and night in all-weather scenarios, while emphasizing operational effectiveness, simplicity, minimum operator intervention, and integration into heterogeneous unmanned arrays.

The system was developed as part of the autonomous battlefield concept led in the DDR&D in collaboration with the Tank and APC Directorate while implementing an open architecture for integrating future capabilities and integrating the robot alongside other tools and capabilities.

The system is a joint product of many years of investment by the DDR&D and the Tank and APC Directorate and is expected to start field tests during 2023 in representative scenarios.

ZeroEyes Partners with Asylon Robotics to Develop Drone-Enabled Active-Shooter Response

ZeroEyes, Inc., creators of the only A.I.-based gun detection video analytics platform that holds the US Department of Homeland Security SAFETY Act Designation, announced a formal partnership with Asylon Robotics, a firm that automates security operations by leveraging aerial and ground robotics for perimeter and drone security and intelligence services. The partnership integrates ZeroEyes' human-verified A.I. gun detection software with Asylon's aerial drone and robot dog video feeds, providing end users with an autonomous response capability in active shooter situations.

The number of law enforcement officers killed intentionally in the line of duty reached a 20-year high in 2021, with gunfire being the leading cause of officer deaths. This concerning statistic underlines the need for autonomous, real-time intelligence in active shooter events to react faster to protecting civilians and law enforcement personnel alike.

"Our grandparents and parents had nuclear attack drills from foreign threats, and we adults had fire drills growing up. Our children today have active shooter drills - things aren't heading in the right direction," said Mike Lahiff, CEO of ZeroEyes. "Enabling our A.I. gun detection technology for use beyond static video cameras is a huge step in combating the mass shooting epidemic that our country faces. Our partnership with Asylon Robotics means we're able to outfit unmanned vehicles with real-time gun detection intel and tools such as lights and audible alarms to distract shooters, giving first responders time to respond to threats more quickly and safely from the air or on the ground, when every second counts."

ZeroEyes' proprietary A.I. gun detection technology integrates with existing security cameras to instantly detect visible guns within range of the cameras. When a weapon is detected, ZeroEyes' military-trained operations center analysts verify the detection and alert first responders within 3-5 seconds. This agreement expands the company's footprint beyond static cameras to unmanned systems.

ZeroEyes' A.I. security solution is currently in use in K-12 schools, universities, commercial businesses, US military bases, state and local governments across the country and is monitored 24/7/365 by military veterans. ZeroEyes' solution was also recently awarded a United States Air Force AFWERX Direct-to-Phase II SBIR Grant for Drone-Robot Enabled Active Shooter Deterrence (DRASD), expanding the use of automated security response technology.

"All of Asylon's solutions are built to increase safety and enable the security operations center of the future. Partnering with ZeroEyes to integrate its A.I. gun detection solution into our DroneCore platform is a huge step forward in making that happen," says Damon Henry, CEO and Co-Founder of Asylon Robotics. "Our partnership means we have a more complete solution for customers to safely and intelligently respond to incidents on their properties, such as active shooter scenarios. Adding A.I. gun detection to air and ground security robotics is industry-first and directly in line with our mission to help get the right intel to the right people to make better, faster, and smarter decisions."

Elbit Systems Unveils a Simultaneous Multi-Mission Tactical Radar System

Elbit Systems launches DAiR, an innovative simultaneous multi-mission tactical radar. The system makes target prioritization redundant enabling a step change in the effectiveness and efficiency of tactical terrain dominance, protection against Unmanned Aerial Systems (UAS) and border security.

The DAiR is an X-band software defined radar system that incorporates hundreds of digital receivers, sophisticated algorithms and computing cores with Artificial Intelligence capabilities. The system is capable of simultaneous detection and tracking of thousands objects of various sizes and velocities, with no need for target prioritization. These unique radar capabilities enable a tactical force to use a single radar system for handling of a very large number of targets of various types and ranges including: humans, small quadcopters, helicopters and UAS, vessels and artillery. Small drones are detected from up to 12km and humans from up to 15km. The DAiR radar systems is compatible with the All-purpose Structured EUROCONTROL Surveillance Information Exchange protocols (ASTERIX) enabling seamless sharing of information with C4I systems.

Oren Sabag, General Manager of Elbit Systems ISTAR & EW, said: "As warfare becomes increasingly multi-domain, the target prioritizing capability, that is central to legacy radars, becomes a liability. Forces are compelled to apply multiple radars just to keep up with the evolving threat - holding a common operational picture becomes harder and costs increase. The DAiR radar system addresses these challenges, does not rely on target prioritization, thereby aligning the radar capability with the imperatives of multi-domain warfare."

Volocopter Collaborates with Microsoft on VoloIQ Aerospace Cloud Project

Volocopter, the pioneer of urban air mobility (UAM), announced a strategic collaboration with Microsoft to develop an aerospace cloud system in Microsoft Azure that will address the nascent cloud computing requirements for eVTOLs, UAM, and autonomous aviation. Once primed for commercial use, Azure will support the digital platform VoloIQ, the operating system for Volocopter's UAM services, and its subsequent transition to autonomous operations.

Volocopter plans to make the VoloIQ its standard UAM operating system for all electric passenger and drone flight operations. Its modular structure will be vast, covering aspects like booking and e-commerce, commercial scheduling, operational network planning, flight planning, flight monitoring, supplying airspace digital twins, and vehicle data logging and analysis. Volocopter has chosen Microsoft Cloud / Azure to securely interconnect all these UAM ecosystem elements into one integrated set of services.

"Having Microsoft on board as a project partner and investor is proof that the solutions Volocopter creates – like the VoloIQ – are pioneering and hold remarkable market potential," said Alexander Oelling, Volocopter's Chief Digital Officer. «We›re proud that Microsoft Azure is the one to provide a secure cloud and thus to ensure safety remains at the forefront of our operations.»

Volocopter and Microsoft will begin collaborating by ensuring Microsoft Azure meets the VoloIQ's needs for commercial operations. Azure will then enable the VoloIQ's flight and service support for Volocopter's electric vertical takeoff and landing (eVTOL) aircraft (VoloCity, VoloDrone, and VoloConnect), alongside ground infrastructure (VoloPort) support in real time.

"From the newest technologies to regulation, creating solutions to seamlessly address the cloud computing requirements for supporting continued advancements in aviation is a complex endeavor. We certainly see the potential a secure, robust, and efficient cloud platform could offer aerospace and urban air mobility operators," said Uli Homann, CVP of Cloud and AI at Microsoft. «Working in collaboration with Volocopter, we will start to build the foundation for a commercial model for aerospace cloud.»

The collaboration between Volocopter and Microsoft was first publicized in 2020, when Volocopter and Lufthansa Industry Solutions announced plans to develop the VoloIQ for autonomous aircraft operations using Microsoft Azure.

Dronedek Announces New Partnership with Speedy Eats

Dronedek Founder and CEO Dan O'Toole field's dozens of contacts each week from organizations interested in working with his company, which is one of the first in the world to offer a secure, smart mailbox designed for autonomous deliveries. It's a happy situation for any startup founder, but it also serves as inspiration for the always iterating business leader.

"It's really cool to be at the forefront of a transformative industry and to see so many others whose innovations dovetail perfectly into ours," he said. "Consumers want increasingly faster deliveries of the products they buy whether that's lunch, medicine, or any other item. They also want a secure and reliable way to receive those products, and that's what we provide."

As a case in point, Dronedek recently entered into an agreement with Speedy Eats, which is developing mobile kitchens designed to be located in parking lots to provide quality food fast via drive-thru and autonomous delivery.

DRONEDEK

"Speedy Eats is the first automated restaurant on the planet," said Founder and CEO Frederick Speed Bancroft. "Bringing Dronedek into the mix will make our customers' experience even better."

Speedy has the capability of serving customers via delivery and/or takeout all from its patent pending platform. Speedy Eats serves pizzas, BBQ, chicken tenders, wings, breakfast items, salads, wraps, sushi, subs, chicken salad, cold beverages, side items and condiments. The restaurant units are all electric and designed for high-traffic spaces.

Drones World Editor Kartikeya in Conversation with Pioneer in the UAV Industry Col Ravi Bandreddi

Your profile covers a portfolio of a vast experience. Can you brief about your journey so far to our readers?

My career has started in the Army, beginning with Artillery systems and thereafter transitioning to Unmanned Systems. I have been fortunate to be one of the Pioneers of UAV systems in India and lucky to be the First UAV pilot and raise a UAV Unit way back in 1999. Since then my travel has enabled me to earn many distinctions in the UAV domain from being the first Chief Qualified Instructor for UAV's , Head of UAV training School, being the first Indian UAV Test Pilot for the MALE category of UAV's to being the first Chief evaluator for categorising UAV pilots in the Army. After taking Voluntary retirement, I was amongst the earliest adopter of innovative tech solutions across a wide variety of business sectors. Being able to contribute to the regulatory policy frameworks, standard shaping and public-private partnership initiatives across each of these industries has also been personally rewarding, especially while being part of the FICCI Committee on Drones and FICCI Committee on Homeland Security for the past three years. The past 25 years of my experience in Drones, especially during raising of Operational units, and thereafter during start-up and growth phases in commercial space, has helped me gain in-depth experience in envisioning, planning, and executing large-scale technology platforms and driving strategic business initiatives. One of the most exciting experiences was establishing and operationalizing 3 UAV bases for the United Nations in Central African Republic and then spearheading the Homeland Security Vertical of Dynamatic Technologies Ltd, where I was engaged in the business and technology strategy. Currently, as Strategic Business Development & Technology Consultant (RPAS / UAV), with Elbit Systems, I provide business development, technical expertise and management analysis to develop business cases for emerging opportunities in India. I have started engaging on multiple strategic initiatives for Elbit Systems in India

Indian Gov. is trying its best to bring the best drone regulations/ policies in India, what according to you is still missing with regards to Drone Ecosystem?

India is a country where entrepreneurship is now being admired, appreciated, and encouraged. There are numerous types of business ideas that are flourishing in India today, one of the most promising ones being drone technology. Indian Start-ups are slowly getting into drone technology. Drone or unmanned aerial vehicle (UAV) is a powerful technology that can be used for various purposes. In drone technology, India is witnessing a new wave of innovation with a boom in the number of start-ups. Drone technology and start-ups are helping solve several real time problems by bringing innovative solutions using drones.

It all started with the government coming out with the more liberal Drones Rules, in August 2021, replacing the previous UAS (unmanned aerial systems) Rules. "These rules made testing of drones much easier," The drone ecosystem was taking root even earlier, but the easier rules have gingered things up. "For a start-up," "three things are required — talent, capital and ecosystem." While there is no dearth of talent, and 'capital' is now more accessible, it is the ecosystem that is still deficient. We still need to plug this gap.

The Push for indigenisation of drones is enabling the ecosystem to unfold nicely. "Indigenisation levels in drones have increased from 5 per cent to 25 per cent in the last three years", which, is a good sign. Earlier the 'brushless direct current' (BLDC) motors , composite based propellers , Electronic components , Auto Pilots, Communication Systems and Batteries needed to be imported. There are few companies which now have invested to make propulsion systems and engines, as also make BLDC motors in India.

Another element in the ecosystem is insurance, which is now mandatory for drones. While insurers do offer products like for motor vehicles, both 'own damage' and 'third-party liability', insuring drones is complicated, as it calls for mapping the risks in every area the drone would fly in. A start-up called Tropogo has jumped in to provide this risk-mapping service.

The market for drones is exploding. Apart from the armed forces, sectors such as medicine delivery, logistics, surveillance and agriculture, among many others, need drones. The government itself will be a big buyer, under its Swamitva Yojana, a scheme to map land parcels in 6 lakh villages to help provide a 'record of rights' and 'legal ownership cards' to village households. A couple of hundred drone companies have come up in India, making vehicles for different applications these can be sustained if we have a Robust Drone Eco system.

You have been flying Drones and training Drone pilots for quite long time. What is your say on the current DGCA`s training curriculum?

Drone technology and industry is evolving very rapidly in India and the world. Drones are being used to accomplish very challenging

tasks in a growing number of fields and many industrial applications. Drones will be using the same airspace which is used by manned aircrafts and hence it is of utmost importance to have qualified and trained Drone pilots, who understand Air Regulations, Air Traffic Management and Air Safety. Hence, one needs to undergo proper training even if they are experienced drone flyers as it has become a legal requirement now.

The Indian government is promoting the drone industry in India which is expected to create around one lakh jobs in the coming years. The government eased regulations too and removed strict mandates needed to fly drones. However, to become a professional drone pilot in India, candidates must get a certificate from an institute approved by DGCA, the aviation regulator.

If you have a look at the course curriculum, it's relatively exhaustive to pack in for a 5 days of course. Also there is very little hands on time and relies more on the basics of autonomous flying and doesn't cater much to recovery of the drones in case of emergencies and Flight safety is just brushed through.

The Drone pilots are given a broad brush or introduction to most of the subjects and rely purely on the software and hardware to perform rather than have a in depth knowledge, which in the long run may not be the right way forward. The training period I personally believe should be at least 2 to 3 weeks if not more for holistic and professional flight training.

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

"India will be a drone hub by 2030," said Honourable Prime Minister Narendra Modi at the 'Bharat Drone Mahotsav 2022' in New Delhi on May 27.

Drone start-ups and research has been around for several years now. The Indian start up ecosystem has already started to see some of these start-ups emerging. Once there is approval from DGCA for commercial applications for e-commerce companies, deliveries and for the on-demand food delivery services, drones will provide a new way to execute their logistics, however the current legislation aren't quite updated to cater to this technology yet. Startup companies in drone technology began to raise funds and gain recognition, while demand continued to surge. Revenue from business-to-business applications of drone technology is expected to grow more than fourfold over the next decade as the usage of drones expands across industries.

More than 500 startups in India are racing to use drone technology to solve problems like helping farmers monitor crops, inspecting power lines and bridges for companies, providing connectivity to rural areas and monitoring construction sites. The MoD also has started a new scheme or government grant for drone companies to collaborate with foreign technology companies such as companies from Israel etc who are working on Drones Manufacturing, drone propulsion, anti-drone technology and drone monitoring. A classic example of this is the Adani Aerospace - Elbit Systems Joint venture for manufacturing the UAV's in India for India and the World.

Drones across the Defence and commercial sector have specific and unique roles to play. Though the basic concept of the technology remains common, the applications / Utility and the size of the UAV's as also the payloads / sensors are vastly different. Both Defence and Civilian markets are equally good for Drones and have immense scope for development and exploitation of technology.

What are the challenges and opportunities you see in Indian Drone industry?

Commercial drones and their utility have been making waves because of their versatility of applications across various sectors / industries. This new field brings together and expands upon many existing technologies in the fields of: Computer Vision, AI & ML, Advanced and Small CPU's & GPU's, specialized sensors, LiDAR, and manufacturing techniques. The field is heavily influenced by smart devices as well as tablet computers and hence able to leverage their availability in a mass market. Drone technology has caught up to our imagination, in a big way.

Drone technology has a wide range of application from monitoring coastal areas to agricultural purposes to defence applications. Drones can capture the aerial images, motion sensor data, and storing it for analysis may be used for effective crop management, disease control or patrolling on borders. A drone is an aircraft without a human pilot on board. Instead, the UAV is either controlled by someone on the ground or autonomously via a computer program. The soaring popularity of drone technology is helping Indian start-ups create new businesses that range from aerial photography to crop monitoring, warehouse management and surveillance.

However the challenges still are far too many like

regulatory requirements, Security concerns, Quality control, UTM, underdeveloped eco system, educating the users on the utility as also the efficacy of drones. Etc. With the proactive approach of the government as also as the technology proliferates down to the last mile, the challenges will reduce for sure.

Where do you see Indian Drone Industry in the next five or ten years?

The least disruptive technology like drone technology is making headlines almost every day. The developmental potential of drones has brought several billion dollars to invest in start-ups engaged in the drone technology business.

The Government notified a Production Linked Incentive (PLI) scheme for Indian drone manufacturers on 30 September 2021. The scheme seeks to promote a competitive and self-sustaining drone manufacturing industry in India under the Atmanirbhar Bharat Abhiyan. The scheme comes shortly after the announcement of the Drone Rules 2021 which encourages drone operations in India by improving ease-of-doing business and simplifying compliance for the drone industry. The scheme will serve as significant encouragement for investment in the drone sector and for the creation of new Indian start-ups catering to the industry thus contributing to make India a global drone hub by 2030 with an expected turnover of INR 15,000 Cr by 2026.

Foreign drone component manufacturers are also contemplating setting up facilities in India. This will create a self-sufficient drone manufacturing ecosystem in India, with manufacturers of drones no longer requiring the import of foreign components. The Drone Rules 2021 and PLI scheme have been a effective catalyst for augmenting indigenous manufacturing of drones and drone components and creates employment opportunities in the sector.

There now is a large requirement of drone related technology manufacturers who will be catering to demand from defence and commercial sectors. The times is ripe for entrepreneurs for setting up of the manufacturing companies and get benefit from the right government schemes and also choose the right product that will be in the sunrise sector for next 10-15 years.

What are your suggestions to youngsters/ entrepreneurs who wish to enter into the Drone Industry?

Start a **game-changing** career working with dynamic drone technology. From a military innovation, to an exciting hobby, to a technology that's transforming commercial industries; the use of drones has rapidly changed over the past years.

For a budding entrepreneur, owning a drone in this day and age is a latent business opportunity just waiting to be explored and exploited. For opportunistic businesspeople, drones have multiple uses and can be explored and utilized in a variety of ways.

Besides your newfound sense of pride and accomplishment, future **opportunities in the field are limitless.**

Wingcopter scores $42M in latest funding round, leveraging strong product-market fit with multi-million-dollar delivery drone orders.

Wingcopter, the German delivery drone manufacturer and service provider, today announced that it has raised $42 million from renowned financial and strategic investors. The new funding is part of a Series A extension round, tripling the company's total equity raise to more than $60 million to date. Leading German retailer REWE Group as well as German investors Salvia and XAI technologies came on board as new shareholders. They were joined by Japanese conglomerate ITOCHU and previous backers Futury Capital from Germany and Silicon Valley-based Xplorer Capital.

REWE Group as one of Germany's largest grocery retailers with 12,000 stores across Europe is an ideal addition to Wingcopter's investor base and a clear sign that Wingcopter's future will expand beyond medical drone delivery services. Salvia, with an investment focus on disruptive technologies, is known for its early investment in German biotech champion BioNTech and will actively support Wingcopter's growth path with its longstanding company building expertise. XAI technologies, founded by machine vision pioneer Enis Ersü, will add additional value thanks to the team's deep knowledge and experience in the fields of sensor technology and industrial automation. Listed in the Fortune Global 500 index, ITOCHU is one of Japan's largest trading companies and will open new doors to the promising Japanese market.

With the fresh funding, Wingcopter will be able to further expand its drone delivery services globally and ramp up production of the world's most efficient eVTOL delivery drone, the Wingcopter 198. Wingcopter has been experiencing a continuously growing demand for its new unmanned aircraft system and has already sold most production slots for this and next year. Wingcopter's production facility in Germany is designed to manufacture thousands of Wingcopter drones per year and will soon start with partly automated production work, significantly speeding up the production process.

Moreover, Wingcopter plans to use the capital injection to accelerate the firm's R&D efforts with regards to new product features and to hire 80 new employees across all departments within the next months. The new capital raise comes shortly after the Federal Aviation Administration (FAA) had approved the Airworthiness Criteria for the Wingcopter 198, which marked a critical milestone in the U.S. Type Certification Process of the company's flagship aircraft.

"At Wingcopter, we create efficient and sustainable drone solutions to save and improve lives. For this, we are hiring passionate pioneers with whom we build what has not existed before," said Tom Plümmer, Co-founder and CEO of Wingcopter. "The new funding, combined with growing revenues, puts us in an excellent position to establish our industry-leading drone delivery solution with our customers around the globe to optimize supply chains."

Christoph Eltze, Executive Board member Digital, Customer & Analytics and IT at REWE Group, adds: "REWE Group is one of the most innovative companies in German retail. For years, we have relied on strong partnerships with innovation leaders, especially in emerging trends. With Wingcopter, we have found such a new partner."

"With its disruptive technology and highly motivated team, Wingcopter has the potential to become a frontrunner in the drone delivery space. In the face of global challenges such as climate change, innovative companies such as Wingcopter are needed to lead an industry like logistics into a sustainable, more efficient future. We are pleased to accompany this success story from now on as an investor and sparring partner," adds Helmut Jeggle, Founder & Managing Partner of Salvia.

"We are excited to join the Wingcopter team on their way to the next growth milestones as a leader in drone delivery logistics," explains Enis Ersü, Managing Owner of XAI technologies and former CEO of ISRA VISION. «Being an investor and a technology partner at the same time our team at XAI technologies is very much looking forward to generating further business potential by integrating advanced key technologies and operational excellence together with the management.»

Amazon Prime Air prepares for drone deliveries

Amazon customers in Lockeford, California, will be among the first to receive Prime Air drone deliveries in the U.S. The promise of drone delivery has often felt like science fiction. We've been working for almost a decade to make it a reality.

The challenge: How do you get items to customers quickly, cost-effectively, and—most importantly—safely, in less than an hour? And how do you do it in a way that can scale? It's relatively easy to use existing technology to fly a light payload a short distance that's within your line of sight, but it's a very different challenge to build a network that can deliver to customers across large communities.

Our teams of hundreds of scientists, engineers, aerospace professionals, and futurists have been working hard to do just that—and later this year, Amazon customers living in Lockeford, California, will become among the first to receive Prime Air deliveries.

Lockeford has historic links to the aviation industry. The community boasts one of the early pioneers of aviation—Weldon B. Cooke, who built and flew early planes in the early 1900s—as a former resident. Now, over a century later, residents will get the opportunity to sign up for free drone delivery on thousands of everyday items. Lockeford residents will play an important role in defining the future. Their feedback about Prime Air, with drones delivering packages in their backyards, will help us create a service that will safely scale to meet the needs of customers everywhere—while adding another innovation milestone to the town's aviation history.

As we launch the service in Lockeford, we'll also be investing in the community, creating new jobs, building partnerships with local organizations, and helping reduce carbon emissions—all thanks to this futuristic technology that could one day become just as common as seeing an Amazon delivery van pull up outside your house.

"Lockeford residents will soon have access to one of the world's leading delivery innovations," said California State Assemblyman Heath Flora, whose district includes Lockeford. "It's exciting that Amazon will be listening to the feedback of the San Joaquin County community to inform the future development of this technology."

We are working with the Federal Aviation Administration (FAA) and local officials in Lockeford to obtain permission to conduct these deliveries and will continue with that collaboration into the future.

What's different about Prime Air?

The logistics industry is abuzz with all-things drones. But not all drone systems are equal. For example, most drones do not have the capability to sense and avoid other aircraft and obstacles—and it's easy to understand why that could pose problems. Those systems will require visual observers along the route of every flight to help the drones avoid hazards. That type of drone can be deployed relatively quickly, but it limits delivery operations to a small radius.

We're building something different. We've created a sophisticated and industry-leading sense-and-avoid system that will enable operations without visual observers and allow our drone to operate at greater distances while safely and reliably avoiding other aircraft, people, pets, and obstacles.

We designed our sense-and-avoid system for two main scenarios: to be safe when in transit, and to be safe when approaching the ground. When flying to the delivery location, the drones need to be able to identify static and moving obstacles. Our algorithms use a diverse suite of technologies for object detection. Using this system, our drone can identify a static object in its path, like a chimney. It can also detect moving objects on the horizon, like other aircraft, even when it's hard for people to see them. If obstacles are identified, our drone will automatically change course to safely avoid them. As our drone descends to deliver the package into a customer's backyard, the drone ensures that there's a small area around the delivery location that's clear of any people, animals, or other obstacles.

Since the inception of Prime Air, we have designed, built, and tested many drones. In fact, we've created more than two dozen prototypes. Below are some of our designs, including our latest version, which we're excited to now use to make customer deliveries in real-world environments.

We've worked closely with the FAA and other regulators throughout. Prime Air is one of only three drone-delivery companies that has gone through the rigorous process to earn a FAA air carrier certificate, which will be required to operate drones using these advanced capabilities.

It took years of inventing, testing, and improving to develop these breakthrough technologies, and we're excited to use them to make customer deliveries.

What's next?

Once onboarded, customers in Lockeford will see Prime Air-eligible items on Amazon. They will place an order as they normally would and receive an estimated arrival time with a status tracker for their order. For these deliveries, the drone will fly to the designated delivery location, descend to the customer's backyard, and hover at a safe height. It will then safely release the package and rise back up to altitude.

Matternet Takes Over Drone Business from Swiss Post.

Matternet announced it is embarking on the next chapter of its drone operations in Switzerland. Starting January 1, 2023, Matternet will take over drone business activities from Swiss Post, in addition to providing its technology platform and operating customer drone delivery networks.

"We thank Swiss Post for the partnership and all that we accomplished together over the last five years," said Andreas Raptopoulos, CEO of Matternet. "With the extensive experience we have gained from operating drone delivery networks over Swiss cities since 2017, we are now ready to take the next step toward our vision of city-wide, ultra-fast and environmentally-friendly drone delivery networks in Switzerland."

Matternet considers Switzerland one of the most advanced countries in the world for scaled drone delivery operations, enabled by a robust regulatory framework established by the Federal Office of Civil Aviation (FOCA) and Switzerland's focus on world-class, efficient logistics and environmentally-friendly technologies.

During its successful five-year partnership with Swiss Post, Matternet provided its urban drone delivery platform and operated commercial routes for Swiss Post customers. Matternet and Swiss Post achieved multiple world-first milestones together, such as operating the first BVLOS commercial drone delivery route over a city in Lugano (2017) and the first BVLOS commercial drone delivery route in a major European city in Zurich (2018).

Matternet now plans to build on this foundation to launch, alongside a group of private and public entities, the first European city-wide drone delivery network in Switzerland. The network's initial focus will be healthcare logistics for B2B and B2C applications. Further details will be announced in the coming months.

Matternet's vision is that the city of the future will rely on a city-wide drone delivery network to fulfill urgent logistics needs for healthcare and help transition on-demand ecommerce to a sustainable mode of transport. Matternet announced its first network in partnership with the Department of Health of Abu Dhabi (link) in September 2021.

DRONAMICS becomes the first drone cargo company to obtain an operational licence

DRONAMICS, the leading middle-mile cargo drone developer and operator announced that it has obtained the EU's Light UAS Operator Certificate (LUC). The LUC is recognised in all EU member states and provides drone operators with significant business opportunities across the single market.

The announcement made during EBACE (European Business Aviation Conference Exhibition) comes at a key moment as the company prepares for the first commercial flights of its flagship Black Swan aircraft later this year. Carrying 350 kg at a distance of up to 2,500 km, the Black Swan aims to transform supply chains by making fulfilment more efficient, resulting in cost, time and carbon emission savings.

DRONAMICS is the first cargo drone company to secure the licence granted by the Transport Malta Civil Aviation Directorate (TM - CAD), the country's Civil Aviation Authority. It allows it to self-authorise flight operations of its Black Swan aircraft across EU countries, including Beyond Visual Line Of Sight (BVLOS) operations.

DRONAMICS plans to scale up its operations and run its first commercial flights out of Malta and Italy later this year. With Malta as its European operations base, DRONAMICS is well placed to operate its first routes over the Mediterranean, linking key hubs across the region.

Transport Malta has been spearheading the advancement of aviation innovation in Europe, thanks to its expertise as a global aviation hub as well as government support for the UAS (Unmanned Aircraft Systems) sector.

"During the past several months, our dedicated CAD inspectors, who did the job diligently, validated our belief in new technologies and innovation within the aviation industry. Since the initial contact with DRONAMICS, the operational concept, the experienced and passionate team, and above all the company mission, made us believe that DRONAMICS will be the pioneer of a new, safe, and exciting era of the drone cargo long range operation. I would also like to thank the Rangelov Brothers and DRONAMICS' Airline team for selecting Malta for their new LUC and we are proud to have DRONAMICS as our new member of the 9H community.", Capt. Charles Pace, Director General of Civil Aviation Directorate Transport Malta (TM-CAD)

"Becoming the first cargo drone company to obtain LUC certification is a huge milestone for us and validates years of hard work in developing our unique and market-leading solution. Our team has been involved in numerous AOCs on several continents before, and we are continuously impressed with the world-class professionalism and expertise of Transport Malta, coupled with a pro-innovation mindset. With the support of such a sophisticated and technologically advanced regulator, and with Malta as our European operations base, we are well placed to progress our operations and start serving key routes across the Mediterranean later this year and continue our future expansion so that we can achieve our mission to enable same-day delivery for everyone, everywhere." – said Sergio Oliveira e Silva, COO of DRONAMICS.

Swoop Aero and partners to launch integrated drone logistics network in Kenya

Swoop Aero has partnered with the drone services subsidiary of heavy air logistics specialist Astral Aviation and drone operations partner Skyports, to launch a drone logistics network in Kenya. Swoop Aero's experience operating drone logistics networks in 7 countries alongside their native technology platform will be employed to transport medicines, vaccines, and medical samples between healthcare facilities and patients in need across Kenya, beginning with last-mile delivery by the end of 2022. These operations present a first for the region, encompassing the first Beyond Visual Line of Sight (BVLOS) drone flight and operation demonstration approvals, launched in close coordination with the Kenyan Civil Aviation Authority to ensure safety and compliance with local regulations.

Swoop Aero will deploy its complete technology infrastructure and drone logistics experience in this latest endeavour with local Kenyan experts Astral Aerial Solutions operating the network, closely in partnership with drone infrastructure provider, Skyports, to rapidly improve access to routine and emergency medicine, vaccines and pathology in the region.

"We're excited to be expanding Swoop Aero's service in Kenya in partnership with Astral Aerial Solutions and Skyports, in what will be a first for the region. Kenya represents the 14th country in which the Swoop Aero technology platform has underpinned BVLOS drone logistics regulatory approvals. The regulatory approvals and operations will bring Swoop Aero closer to providing an integrated drone logistics service to 100 million people by 2025", said Eric Peck, CEO of Swoop Aero.

The partnership will extend the reach of Swoop Aero's existing integrated logistics platform, supporting the transport of medical samples and supplies with cold-chain delivery, as well as remote access operations and ease of integration into the region's existing healthcare network with minimal need for additional infrastructure.

Kenyan-based drone operator, Astral Aerial Solutions, brings a history of local aviation expertise and in collaboration with Swoop Aero's leading integrated drone logistics platform, will provide a world-class healthcare solution to clients in the first and last mile. "We're excited to be coming together with Skyports and Swoop Aero to offer last-mile delivery solutions in Kenya. This partnership presents a unique opportunity to reduce delivery times and increase accessibility to healthcare and other industries that may support drone logistics into the future.", said Kush Gadhia, CEO Astral Aerial Solutions.

Skyports has previously partnered with Swoop Aero to deliver and distribute COVID-19 commodities across the UK, saving over 11,000 hours of pathology wait time with flights spanning a distance of 14,000km. Speaking on their newest venture, Skyports' Alex Brown, Director Drone Services said, "This week Astral Aerial Solutions, Swoop Aero and Skyports flew Kenya's first Beyond Line of Sight (BVLOS) drone deliveries. These first flights represent the key first step of our plan to bring drone deliveries to Kenyan communities, improving connectivity, logistics and healthcare".

SkyDrop, Domino's gear up to launch commercial drone delivery trial in New Zealand

SkyDrop announced that production of the drone fleet for the commercial drone delivery trial with Domino's is now complete. SkyDrop (formerly known as Flirtey) and Domino's Pizza Enterprises Limited (Domino's), signed an agreement earlier this year to launch the second phase of commercial drone deliveries in New Zealand. This commercial trial with Domino's is scheduled to launch in New Zealand in the coming months.

SkyDrop is a full-stack solutions provider of hardware, software and patents for autonomous last-mile drone delivery. SkyDrop values safety and has manufactured the drone delivery aircraft to meet SkyDrop's robust quality assurance standards and regulatory requirements. SkyDrop's operational system consists of two aircraft, one ground infrastructure platform, and one autonomous control station that enables a seamless and frictionless workflow at the store location and scalable store-to-door drone delivery operations.

SkyDrop's drone delivery system enables delivery of Hot & Fresh pizza from the local Domino's store to the customer's home. SkyDrop drones can carry a variety of Domino's menu options, including popular choices such as: three Extra-Large Domino's pizzas, or two Large Domino's pizzas with one soda and one side dish (including dipping sauce). In preparation for the commercial trial, SkyDrop is currently conducting test deliveries at its facilities in Reno, NV.

SkyDrop has raised approximately $40 million total investment to date, including a recent $2 million new investment from existing investors Sierra Angels, McFlirtey, Melbourne Angels, and Icehouse Ventures that is focused on advancing the commercial trial launch with Domino's in New Zealand.

Wingcopter scores $42M in latest funding round, leveraging strong product-market fit with multi-million-dollar delivery drone orders.

Wingcopter, the German delivery drone manufacturer and service provider, today announced that it has raised $42 million from renowned financial and strategic investors. The new funding is part of a Series A extension round, tripling the company's total equity raise to more than $60 million to date. Leading German retailer REWE Group as well as German investors Salvia and XAI technologies came on board as new shareholders. They were joined by Japanese conglomerate ITOCHU and previous backers Futury Capital from Germany and Silicon Valley-based Xplorer Capital.

REWE Group as one of Germany's largest grocery retailers with 12,000 stores across Europe is an ideal addition to Wingcopter's investor base and a clear sign that Wingcopter's future will expand beyond medical drone delivery services. Salvia, with an investment focus on disruptive technologies, is known for its early investment in German biotech champion BioNTech and will actively support Wingcopter's growth path with its longstanding company building expertise. XAI technologies, founded by machine vision pioneer Enis Ersü, will add additional value thanks to the team's deep knowledge and experience in the fields of sensor technology and industrial automation. Listed in the Fortune Global 500 index, ITOCHU is one of Japan's largest trading companies and will open new doors to the promising Japanese market.

With the fresh funding, Wingcopter will be able to further expand its drone delivery services globally and ramp up production of the world's most efficient eVTOL delivery drone, the Wingcopter 198. Wingcopter has been experiencing a continuously growing demand for its new unmanned aircraft system and has already sold most production slots for this and next year. Wingcopter's production facility in Germany is designed to manufacture thousands of Wingcopter drones per year and will soon start with partly automated production work, significantly speeding up the production process.

Moreover, Wingcopter plans to use the capital injection to accelerate the firm's R&D efforts with regards to new product features and to hire 80 new employees across all departments within the next months. The new capital raise comes shortly after the Federal Aviation Administration (FAA) had approved the Airworthiness Criteria for the Wingcopter 198, which marked a critical milestone in the U.S. Type Certification Process of the company's flagship aircraft.

"At Wingcopter, we create efficient and sustainable drone solutions to save and improve lives. For this, we are hiring passionate pioneers with whom we build what has not existed before," said Tom Plümmer, Co-founder and CEO of Wingcopter. "The new funding, combined with growing revenues, puts us in an excellent position to establish our industry-leading drone delivery solution with our customers around the globe to optimize supply chains."

Christoph Eltze, Executive Board member Digital, Customer & Analytics and IT at REWE Group, adds: "REWE Group is one of the most innovative companies in German retail. For years, we have relied on strong partnerships with innovation leaders, especially in emerging trends. With Wingcopter, we have found such a new partner."

"With its disruptive technology and highly motivated team, Wingcopter has the potential to become a frontrunner in the drone delivery space. In the face of global challenges such as climate change, innovative companies such as Wingcopter are needed to lead an industry like logistics into a sustainable, more efficient future. We are pleased to accompany this success story from now on as an investor and sparring partner," adds Helmut Jeggle, Founder & Managing Partner of Salvia.

"We are excited to join the Wingcopter team on their way to the next growth milestones as a leader in drone delivery logistics," explains Enis Ersü, Managing Owner of XAI technologies and former CEO of ISRA VISION. «Being an investor and a technology partner at the same time our team at XAI technologies is very much looking forward to generating further business potential by integrating advanced key technologies and operational excellence together with the management.»

Mahendra Singh Dhoni to become a Shareholder in leading Drone Start-up Garuda Aerospace.

Mahendra Singh Dhoni has been roped in to be the Brand Ambassador and Shareholder in Garuda Aerospace.

About his association with Garuda, M S Dhoni said, "I'm happy to be a part of Garuda Aerospace and look forward to witness their growth story with the unique drone solutions they have to offer."

Agnishwar Jayaprakash, Founder CEO of Garuda Aerospace is ecstatic about the development, "I've always been an Ardent Admirer of Mahi Bhai & to have him as a part of the Garuda Aerospace family is honestly a dream come true" said Agnishwar. He added by saying "Mahi Bhai is the epitome of Dedication & I firmly believe that having Captain Cool on our Cap table adds tremendous value which will motivate our team to perform better."

"Garuda Aerospace has been a pioneer in the Indian Drone Ecosystem & is firmly on the path to become India's 1st ever Drone Unicorn Start-up" concluded Agnishwar Jayaprakash. Equipped with 300 drones & 500 pilots operating in 26 cities, Garuda Aerospace drone manufacturing facilities were recently launched by Honourable Prime Minister Narendra Modi.

TeraWatt Technology completes Series B funding to accelerate pilot production of its next-gen lithium-ion batteries.

TeraWatt Technology, a next-gen lithium-ion battery producer for diverse electrified applications, has announced the completion of Series B funding led by Temasek, a global investment company headquartered in Singapore. Investors from Series A, including Khosla Ventures, JAFCO, and Scrum Ventures participated again in this round. Coral Capital and Daikin joined the Series B round as a new investor.

The investment will accelerate the development and the production of TeraWatt's commercial-grade flagship batteries that combine high energy density with high power density under wider operating temperatures and moderate external pressures. The batteries aim to electrify a variety of automobiles with a longer-driving range, increase the payload and flight-time of advanced drones, and enable emerging applications such as eVTOLs, among others. The batteries with a capacity of 6,800mAh and an energy density of 416Wh/kg have already passed UN38.3* and all the safety test items in IEC62133-2*, conducted by a third party, UL Japan, Inc.

"We are thrilled to move forward, with this Series B funding, to accelerate the development and production of our commercial-grade cells at scale with precision and safety," said TeraWatt Technology founder CEO Ken Ogata, Ph.D. "Importantly, working with world-leading investors who have significant track records in the space would add significant value to our mission, electrifying all for the sustainable future."

Shield AI Raises $165M Series E to accelerate building of the world's best AI pilot

Shield AI, a fast-growing defense technology company building AI pilots for aircraft announced it has raised $90 million in equity and $75 million in debt as part of a Series E fundraising round, increasing the Company›s valuation to $2.3 billion. With this deal, Shield AI joins SpaceX, Palantir, and Anduril as the only multi-billion-dollar defense-tech startups of the past 20 years.

"The future of defense aviation is autonomy. AI pilots are the most disruptive defense technology of our generation – and Shield AI is committed to putting the world's best AI pilots in the hands of the United States and our allies. No company has assembled more, or recruits better AI engineering talent for, aviation autonomy and intelligent swarming than Shield AI,» said Shield AI›s co-founder and CEO, Ryan Tseng.

The round was led by Snowpoint Ventures' Doug Philippone, who has also served as Palantir's Global Defense Lead since 2008, with participation from multiple top-tier venture funds including Riot Ventures, Disruptive, which led Shield AI's Series D, and Homebrew, which led Shield AI's seed round. Previous lead investors include Point72, Andreesen Horowitz, Breyer Capital, and SVB Capital.

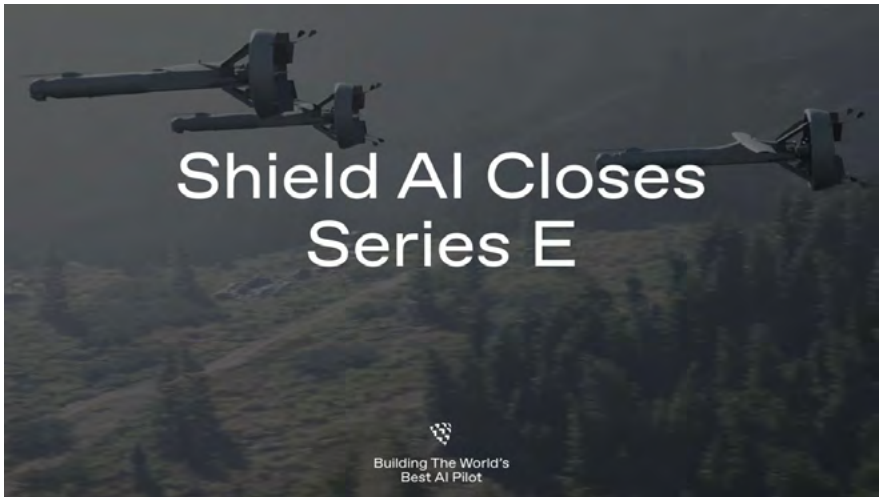
"Investors are flocking to quality. This round is a reflection of Shield AI's success in creating great products, building a business with strong fundamentals, and dominant technological leadership – with an AI pilot proven to be the world's best in numerous military evaluations. We love that they are leveraging an AI and software backbone across a variety of aircraft to deliver truly game-changing value to our warfighters. The work they are doing today is just the tip of the iceberg," said Doug Philippone, co-founder of Snowpoint Ventures.

Shield AI's Hivemind software is an AI pilot for military and commercial aircraft that enables intelligent teams of aircraft to perform missions ranging from room clearance, to penetrating air defense systems, and dogfighting F-16s. Hivemind employs state-of-the-art algorithms for planning, mapping, and state-estimation to enable aircraft to execute dynamic flight maneuvers and uses reinforcement learning for discovery, learning, and execution of winning tactics and strategies. On aircraft, Hivemind enables full autonomy and is designed to run fully on the edge, disconnected from the cloud, in high threat, GPS and communication-degraded environments.

Shield AI's hardware products are its small-unmanned aircraft system (sUAS) Nova, and its medium-size vertical take-off and landing (VTOL) UAS, V-BAT. Hivemind is integrated onboard Nova and has been deployed in combat since 2018; it will soon be integrated onboard the V-BAT to further enhance its class-leading capabilities.

"Russia and China are jamming GPS and communications. U.S. and allied forces need swarms of resilient systems flown by AI pilots to operate in these denied environments. We call it low-cost, distributed strategic deterrence. If we had put up a bunch of AI-piloted swarms on the border of Ukraine, the Russians may have thought twice about invading. Distributed swarms are also more survivable than traditional strategic assets like an aircraft carrier (which is a high-cost, centralized strategic deterrent). Every ally is modernizing their military, and they're looking at how AI-piloted aircraft can give them a strategic, tactical, and cost advantage," said Brandon Tseng, Shield AI's co-founder, President, and a former Navy SEAL.

"At the end of the day, this round and Shield AI's work will positively contribute to global security and stability, which are foundational to human progress. Advancements in technology, medicine, education, and the overall human condition are made when security and stability are strong. This requires the United States and our allies, forces for good, to have the best capabilities at their disposal — including AI pilots that protect people and deter conflict,» said Shield AI›s co-founder and CEO, Ryan Tseng.



Airspace Link completes a $23M Series B Round, led by Avanta Ventures, to accelerate the safe integration of drones

Airspace Link Inc, a leading provider of drone safety software and data solutions, announced the completion of a $23M Series B capital raise led by Avanta Ventures with new investment from Morningside, Caprock, and follow-on investment from Altos Ventures, Indicator Ventures, 2048 Ventures, Detroit Venture Partners, and Thales Group.

Founded in 2018 in Detroit, Michigan, Airspace Link has seen rapid growth over the past few years, as it drives the industry forward in safely integrating drones into communities at scale. The company has raised a total investment of $37M, expanding its impact and value for partners and customers exponentially in the past year alone. The team has put that capital to work, rapidly expanding products and services while growing from 17 employees to near 50.

"Drones are an exciting new form of mobility, with advanced hardware now available at scale. Airspace Link provides the safety infrastructure for drones, focusing on the precise data, software, and analytics required to support scalable operations. Airspace Link's products and services, through the AirHub® Platform, are utilized in all aspects of the industry, whether for informing safety cases, compliance, policy decisions, risk management, or insurance modeling. We're excited to rapidly expand our offerings and societal impact with this infusion of capital. " says Michael Healander, Co-Founder & CEO of Airspace Link.

As the venture capital arm of CSAA Insurance Group, a AAA insurer, Avanta Ventures is aligned with one of the top personal lines of property and casualty insurance underwriters in the United States.

"Our investment in Airspace Link aligns with our deep focus on mobility innovation, safety, and risk management," says David Li, Principal at Avanta Ventures. "We look forward to working with Airspace Link to accelerate aerial mobility in the safest manner for consumers and communities at scale."

With this funding, Airspace Link will continue to invest in and expand on initiatives to support the safe scaling of drone usage through:

- Delivering safe, performant, and neutral Supplemental Data Service Provider (SDSP) and UAS Service Supplier (USS) capabilities to enable the acceleration of UAS Traffic Management (UTM) ecosystems.
- Partnering with and supporting drone manufacturers, operators, software, and service providers to jointly execute on our shared vision.
- Strategically expand services globally, with partners like Thales Group and Esri, to support our current customers' expansion and new market development.
- Expanding Airspace Link's Federal Aviation Administration (FAA) public-private partnership, through programs such as LAANC USS, BEYOND, Remote ID, and more initiatives in the United States.
- Continuing to partner with State & Local Government to drive investment supporting drone infrastructure, enabling them to unlock economic, environmental, and social equity objectives delivered through advanced aerial mobility.

"A great validator of go-to-market strategy has been the excitement and buy-in we've seen from investors and partners on our financial business model and partner-centric approach. The confidence of investors, as shown by this capital raise, will enable us to meet the rapidly growing demand we're seeing in the market, both in the U.S. and globally." said Bill Johnson, CFO of Airspace Link.

Drones World Editor Kartikeya in Conversation with Lt Col V S Velan CTO, Elena Geo Systems

You have taken an unusual path covering various studies and leveling up in the Aviation/ Drone industry. Could you brief your multi-faceted profile to our readers?

My journey began in the Army, and I have been working in GNSS domain since 1998. I have been associated in Navic / IRNSS, since its inception in June 2008. I was system manager in charge of developing the monitoring system and GIS for the armed forces during 2003-2011 after which, I retired from the army in 2011 to pursue research in this domain. I have four PG degrees, and six diplomas/certificate courses linked to this domain. I was also a sponsored research scholar of MoD to IIT Kharagpur. In 2012, I was trained by the GIZ of Germany to understand German technology and to bring it to India. Being a founding member of the Integrated Space Cell (ISC) and I have been involved in NavIC from the inception stage since Jun 2008. I was also part of the ISRO team for trial evaluation of the GLONASS-based Multi GNSS receivers and simulators and a member of the committee to draft the Indo-Russian GLONASS signal sharing agreement of 2010, this was signed by the Prime Ministers of India and Russia in Dec 2010. In 2012, I founded Elena Geo System and from then on there was no looking back! Elena's products are result of my research combined with in depth domain knowledge and experience. Today, I am a subject matter expert in Satellite-Based Navigation.

How did this experience-paved way for your ventures? What ignited you to establish 'Elena'?

My experience helped me understand the challenges and bring out right solutions.

"The requirement for having an Indian system can be fulfilled only if ground-based electronics and solutions are available what we call as a downstream application developed for utilizing our satellites. We found that we needed to have someone dedicated to work in the navigation domain", hence we established Elena. Elena means someone who shows the path, someone who throws light on the new path.

In the beginning we faced a lot of challenges:

- The Indian Constellation of satellites (GAGAN & IRNSS) was not fully functional yet when the company began the work to develop satellite-based monitoring solutions.
- The knowledge required to help the company was not available in the country.
- No Multi GNSS hardware was available.
- The company had to concentrate on testing the ground-level algorithms required for Indian geography.

The launching of Indian satellites and their stabilization from 2016 to 2018 triggered the growth of Elena. Elena could now concentrate on the development of complete NavIC-based monitoring systems. Existing products in the GPS domain did not fulfill the requirements of the users. Elena developed its own set of hardware, software, and systems, all optimized for NavIC that made its end-to-end presence in this domain.

What are the various Products & services that you are offering at Elena Geo Systems?

Elena Geo Systems dominates the industry with its position as a global leader in the NavIC based navigation space. Our solutions have unparalleled user experience as the company focuses on maximum accuracy with the most innovative technologies at affordable prices. Solutions created with the vision of continuous innovation through R & D work showcase their rich domain knowledge and a flexible & agile workflow. Elena provides the utmost cutting-edge technology to modernize road safety, ensuring security and operations.

Elena Geo Systems' Industry-Leading and Differentiated Services:

Elena's services enable enterprises to transform their processes to more sophisticated, more real-time to drive significant value, increase efficiency, optimize monitoring, manage associated risks through early notices, leverage advanced analytics to gain actionable insights, and deliver a superior tracking experience.

Elena has an end-to-end presence in this domain with its own set of hardware, software, and systems all optimized for NavIC. Through indigenous R&D, Elena has developed the core processor and built devices around it along with the supporting programs/ algorithms and servers. This provides a complete spectrum of 'Locating and Monitoring Devices' with absolute reliability and an extremely high degree of accuracy.

Elena provides Antenna, Modules, Devices, Solutions and Systems, optimized for monitoring, navigation, IoT applications. These components can be used alone or as a chain in the user systems. These can be customized to work with other systems and solutions that

are existing in the corporates.

We have Intelligent Vehicle Tracking Systems, high precision locating devices, marine NavIC Receivers, etc.

Lt Gen Sanjay Kulkarni PVSM, AVSM, SC, VSM, SM, Ex DG Infantry, launched the **India's first, NavIC Drone Navigation Unit (NDNU)** on 27th May 2022 at Delhi Drone Mahotsav, Pragati Maidan, and New Delhi. This is our product, brought out to help the drone industry.

The Drone rules of India laydown that all drones should use NavIC the Indian Satellite constellation in place of GPS of America. Till now this circuit was not available. Elena's NDNU fills this void there is a high-end military grade version and a commercial version available:

Some of the key features are:

- Support Multi GNSS: NavIC, GPS, GLONASS, GALILEO.
- Uses SBAS: GAGAN, EGNOS, and MSAS.
- Has more than 128 channels.
- Ultra-low power consumption.
- Faster TTFF, Cold start
- No loss of fix due to momentary loss of power.
- Tiny form factor and weight less than 70 grams.

Can you provide an insight into Drone market in Civil and Defense segments? What are their key differences?

In India, the use of drones has been gradually rising in various applications, especially in non-commercial applications for aerial cinematography, land surveys, agriculture & mining activities, disaster management, construction activities and mapping national highways and railway tracks.

In July 2021 report by BIS Research said that the global drone market, which is currently dominated by the US, China and Israel, is estimated to reach US$ 28.47 billion in FY21-22, with India likely to account for 4.25% share.

During the COVID-19 pandemic, drones played a crucial role in carrying out a host of activities—from surveillance and sanitisation to temperature checks and public broadcasting—across the country. This not only helped in minimising the risk of virus spread, but also helped authorities in ensuring the safety of healthcare and police personnel.

In India some of the crucial civilian areas where drone are playing a big role include

Healthcare Delivery Purposes: Telangana the first State in the country to embark on Beyond Visual Line of Sight (BVLoS) flights to deliver a payload comprising vaccines, with the launch of Medicine from the Sky project in Vikarabad. The project, which seeks to deliver medicines, vaccination, and units of blood to remote, rural areas by means of drones, is a collaboration of the Telangana government, World Economic Forum, HealthNet Global and NITI Aayog.

Agriculture

Union Agriculture Minister Shri

Tomar said that Prime Minister Shri Narendra Modi has initiated the use of drones in agricultural activities in the wider interest of farmers. The government is promoting the use of 'Kisan Drone' for crop assessment, digitization of land records, spraying of pesticides and nutrients for which provision has also been made in the budget. Modernization of the country's agricultural sector is on the agenda of the government

Monitoring: The drone technology in the SVAMITVA scheme launched by the Government of India, within less than a year, has helped about half a million village residents to get their property cards by mapping out the Abadi areas. Drones can be used for real-time surveillance of assets and transmission lines, theft prevention, visual inspection/ maintenance, construction planning and management, etc

They can be used for anti-poaching actions, monitoring of forests and wildlife, pollution assessment, and evidence gathering.

Law Enforcement: Drones are also significant for the law enforcement agencies, the fire and emergency services wherever human intervention is not safe and the healthcare services.

A glimpse of the future of drones in India could be seen at the two-day drone festival organized in New Delhi with over 150 companies -- from hardware to software to component OEMs showcasing their solutions.

Defense Drones

In the military context, drones have often been said to be revolutionising warfare, leading the way to military transformation. Drones hold innovative promise for air power and high potential for increased safety for military personnel and civilians alike.

This increased focus on drone technologies by India comes amid their enhanced centrality in conflict. In the Russia-Ukraine conflict, drones have played a central role for both reconnaissance and attack purposes.

In the Indian military, is evolving its tactics to use drones in a major way. All Arms and Services will use drones. The change is significant as drones are now being used by the Indian Army for surveillance purposes at the LAC, as the stand-off with China continues.

For the first time, the Army is now also going for loitering munitions, something operated only by the Indian Air Force (IAF) earlier. In September last year, in a span of less than two weeks, the Indian Army, Navy and Air Force signed multiple contracts worth over Rs 500 crore in the sphere of drone technology with the focus on Indian companies. Sources had at the time termed the procurement of swarm drones and loitering munitions by the Army and Navy part of the 'Revolution in Military Affairs', or RMA, which changes the way war is fought.

Given these global military dynamics, and the Indian government's push for drone manufacturing, a few private military drone manufacturers are developing important technologies.

What are some of the important points to be noted based on your observations on the Drone industry, more specific to India?

It is rather unfortunate to see many drone companies still opting to use GPS as part of their drone navigation systems. Only a few countries in the world have the technological capability to operate large-scale space missions and develop state of the art navigation technology and India is one of them.

NAVIC exemplifies a hybrid technology, providing both civilian and military benefits. With seven satellites, NavIC is considered to be at par with US-based GPS, Russia's GLONASS and Galileo developed by Europe.

Many of the drone manufactures don't really understand the issues with GPS There are no assurance with GPS as it is owned by USA Air Force. Their service has been denied many times to users outside US. This includes Kargil War. Precision Positioning Service not given to India. And there is very less availability, low accuracy, and no reliability and the integrity is doubtful. Coupled with the above GPS has a lot of accuracy issues. So additional measures were used to overcome it such as the following Such as SBAS, LBAS. DGPS, CORS, IGS network and A-GPS techniques. In spite of all this GPS can give only up to 10 M accuracy. It's time to move away from GPS .

NAVIC is assured for Indian public, and had been specially created for the Equatorial Region. It has high availability, accuracy, reliability, and integrity. S Band is the most suited for Indian Terrain, especially the mountains and the seas.

It has enhanced accuracy. And is permanently visible over the Indian sub-continent. NavIC works better than GPS in crowded locations with highest accuracy, both over Indian cities and rural areas. It has been proved that, other than NavIC, other GPS systems loose coverage of equatorial region from 20 minute to 180 minute in a 24-hour cycle.

It is a true step in AITAANIRBHAR BHARAT.

In August 2021 The Indian agency responsible for drone safety, DGCA, updated the drone rules for India. The rules stipulate that "The Central Government may, on the recommendation of the Quality Council of India, by notification in the Official Gazette, specify the standards for obtaining a type certificate for unmanned aircraft systems and such standards may promote the use of the following:

(a) Made-in-India technologies, designs, components and unmanned aircraft systems; and

b) Indian regional navigation satellite system, namely, Navigation with Indian Constellation (NavIC)"

And the changes you wish, if implemented could promote the Drone industry would be?

India a very unique geographical terrain characteristics and drone manufactures should understand and develop their drones accordingly. They have to have equatorial navigation capabilities. It should have navigation capabilities for all terrain and environments.

Adopting NAVIC based systems is the best way forward.

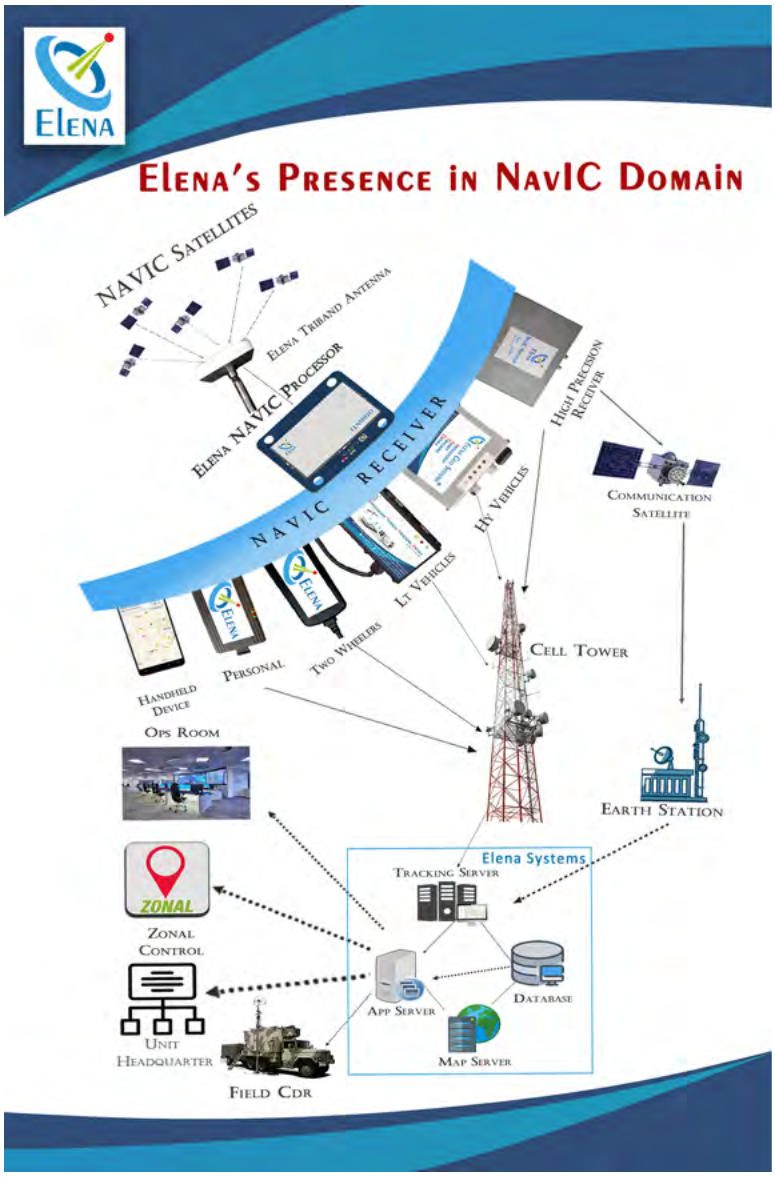
We need to develop drone talent in India. Just like India developed IT talent for the world. Besides having a strong school level curriculum, we need world-class drone schools that focus on high quality and standards, which will enable creation of skilling and white-collar employment in not only urban areas and rural areas. We need to encourage the development of world-class trainers who help train both young men and women and who will have the opportunity to up-skill themselves. We should give them the opportunity here in India rather than have a brain drain abroad.

As far as drone manufacturing goes as of now, drone manufactures are heavily dependent on Chinese made products, considering a grave security risk, we must have more liberal production polices in India, Of course we have the PLI scheme. But we need more. Organizations need research and development incentive, tax breaks, good export and import polices including faster customs clearance abilities.

At a policy level, currently we have the DGCA making all the key decisions as far as drones go. The DGCA is currently understaffed and overworked. Drones development is a multi-disciplinary field for example in Agriculture we have the Ministry of Agriculture and Farmers welfare developing SOP's for drone usage. We have SVAMITVA, a Central Sector Scheme of Ministry of Panchayati Raj was nation-wide launched by the Hon'ble Prime Minister on National Panchayati Raj. Hence, we need a dedicated authority that look into all aspects of advanced air mobility and can coordinate such efforts. This will give all entrepreneurs, organizations, flying schools, a one-stop solution to address all concerns at a policy and implementation level as well.

Again at a policy level we need good data governance policies in place as well. Security Hazards Drones used by the government for the purposes of enforcement of law and order, for prevention of infiltration at border contain sensitive data. Computers are highly prone to get compromised, likewise drones can also be subjected to hacking/jamming/ spoofing and its data can be subjected to misuse. So it is critical to develop stringent drone data governance polices as well. Basically rules on how to govern data is collected, used and stored

Last and the most important part is drone development in rural areas and it's not just about using Agri- drones in farming. It's also about giving Rural India the technological edge. It's about encouraging rural talent to manage their own operations as opposed to traditional methods. It is about imparting a renewed vigor for agriculture in the rural youth so instead of the rural youth abandoning farming and coming to cities to search for technology jobs, they will have cutting edge skills and technology in their own villages.



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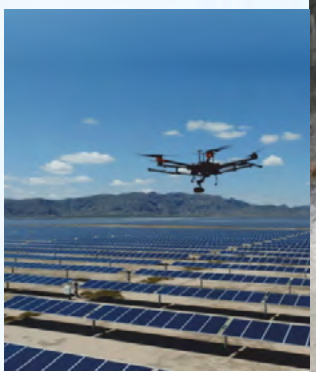
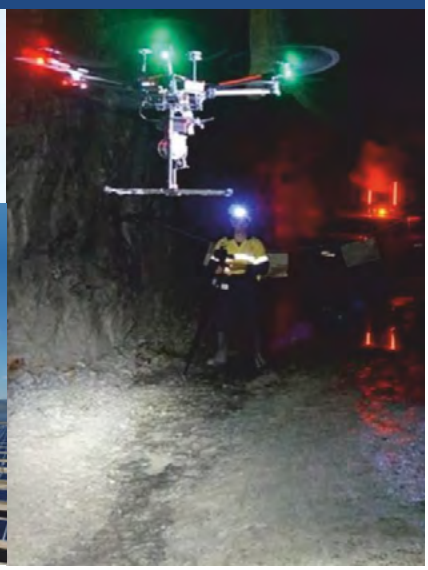

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