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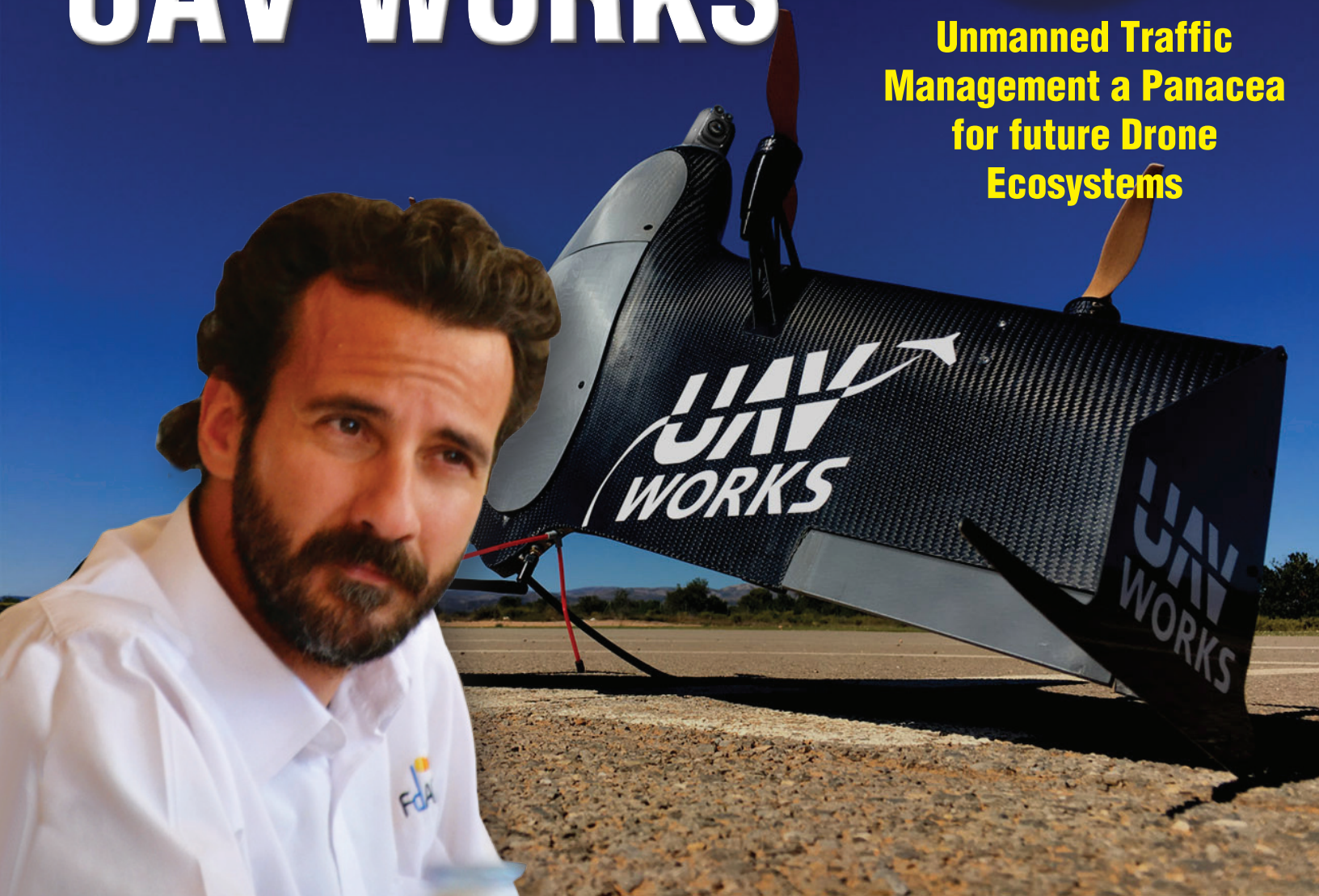

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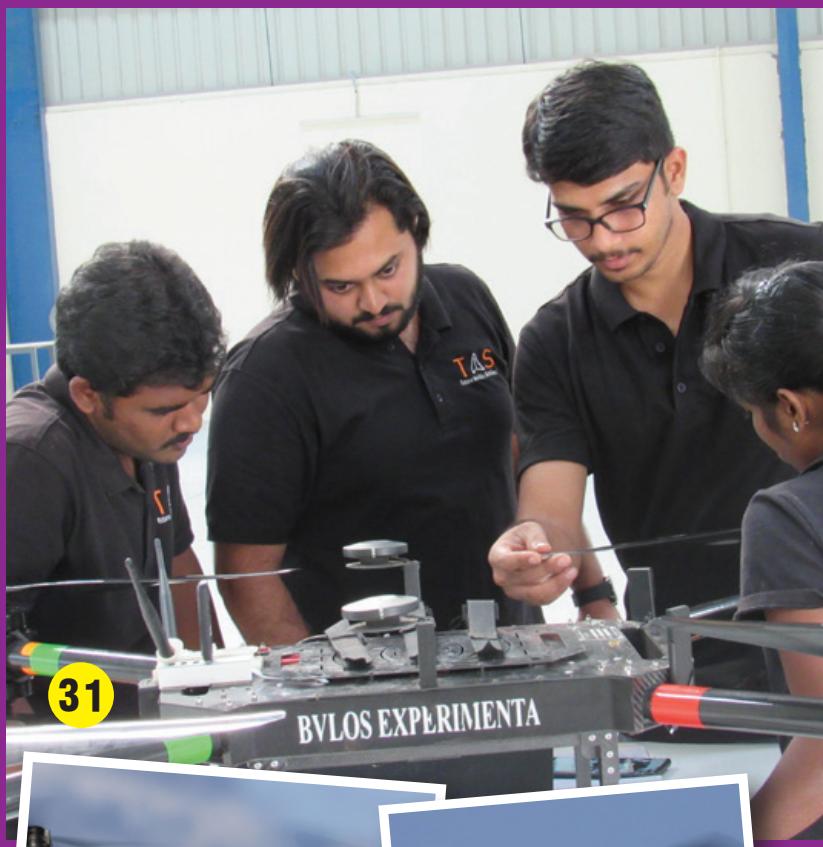

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DRONES WORLD is published by - B. Kartikeya

Hello and welcome to yet another edition of Drones World.

Hope all of you are keeping safe, embracing the new normal and working to get back to normalcy as much as possible.

This month, we are going big with our cover story on Unmanned Drone Management, which is all set to change the very fabric of the drone ecosystem in India.

One of the biggest coverage in our News section is the partnering of Axon with Fotokite to offer fully autonomous drone technology for law enforcement via the Axon Air Program. In another story, we have the Red Cat all set to acquire FatShark to boost their market presence in the First-Person View (FPV) Drone Business.

In our Special Interview this month, we have Mr. Ankit Kumar, who runs the show at Alternative Global, Mr. Nagendran of Throttle Aerospace Systems, and Mr. Yago of UAV Works.

Another exciting feature in our Products section is the all new SkyBOX, that houses an inbuilt portable SSD storage system with built-in Wi-Fi 6 technology and universal compatibility, to ensure effortless streaming and backup of photos, videos, and music files from and to any mobile devices, cameras for drones.Also, as an attempt to automate the entire process of drone flights, we have SkyGrid launching the all-in-one Drone App

Besides, we also have our daily dosage of everything that's happening around the drone world to keep you updated !

This month also marks the auspicious eve of Diwali and I would like to take this opportunity to wish all my readers. May the holy lights of Diwali rekindle our lives and offer us the much needed relief from the curse of the pandemic.

With that, I would like to take your leave for now. More when we meet again with yet another exciting issue of Drones World.

Till then, keep reading, stay safe and God Bless.!

Thanks

B. Kartikeya
Editor

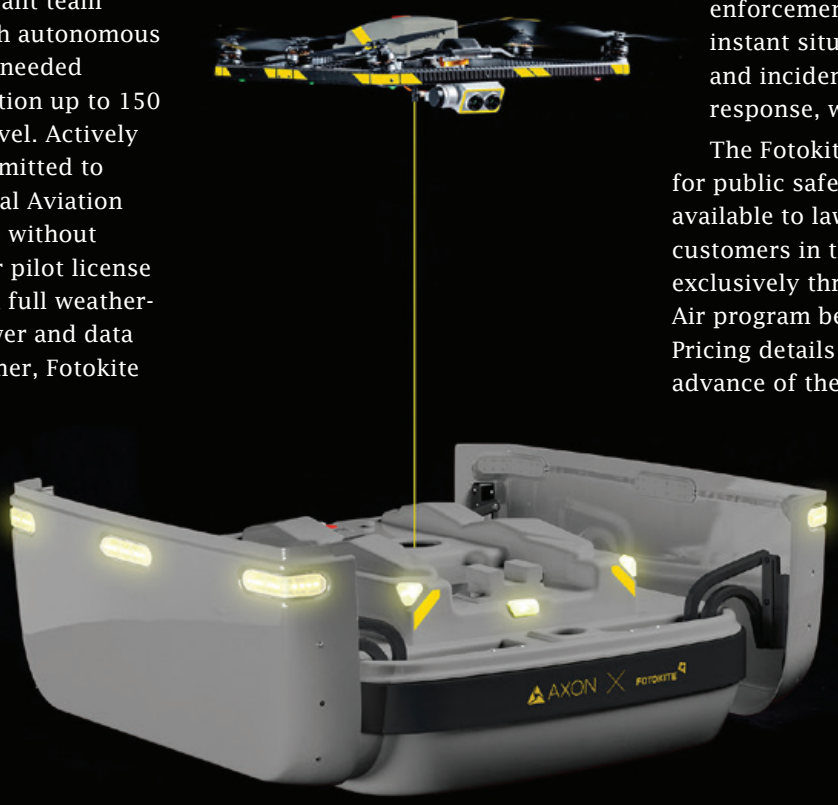
Axon Partners with Fotokite to Offer Fully Autonomous Drone Technology to Law Enforcement via Axon Air Program

Axon, the global leader in connected public safety technologies, announced a partnership with Fotokite, a service provider of actively tethered Unmanned Aerial System (UAS) solutions and public safety software tools, to provide their products and services as part of the Axon Air program. This exclusive partnership will enable Axon's law enforcement customers to view live-streamed footage within Axon's digital evidence management solution, Axon Evidence. The Axon Air program includes the Fotokite Sigma UAS, Fotokite's situational awareness software tools, and the tools needed to view, manage and share video evidence.

The benefits of an actively tethered Fotokite drone versus standard drones are 1) increased safety and 2) significant team resource savings with autonomous flight. No piloting is needed throughout an operation up to 150 feet above ground level. Actively tethered UAS are permitted to be used by the Federal Aviation Administration (FAA) without additional waivers or pilot license requirements. With a full weather-proof rating and power and data delivery over the tether, Fotokite Sigma can fly in harsh weather conditions and stay airborne beyond 24 hours of continuous flight versus the shorter flight times of free-flying drones. Planned benefits and features of the Axon Air and Fotokite partnership include:

- Evidence Management: Fotokite video footage is integrated directly into Axon Evidence allowing agencies a holistic view of what is happening in a given incident/investigation without needing to use an alternate application or tool to view the aerial footage.
- Live-streaming: Staff back at the agency's command center can see what is happening in the field in real-time through Axon Aware situational awareness software, enabling them to deploy resources more quickly and efficiently.
- Program Management: Agencies will save time and money in the operation of this system with simplified program management that does not require federal Part 107 (drone pilot) licenses or a Certificate of Authorization (COA) from the FAA.
- Scalable Aerial Situational Awareness: Traditional drone programs require public safety teams to call trained pilot teams to each scene they are deployed in. As a result, response times are slowed down by the availability of pilots on-scene. Fotokite technology enables scalable aerial scene awareness without the need for pilots on-scene, providing law enforcement the ability to gain instant situational awareness and incident records early in a response, when it matters most.

The Fotokite system is designed for public safety and will be available to law enforcement customers in the US and Canada exclusively through the Axon Air program beginning in 2021. Pricing details will be announced in advance of the launch.



GENERAL DYNAMICS
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General Dynamics Mission Systems and Dedrone Enter Strategic Partnership to Provide Counter-Drone Technology to Defense and Civil Customers

General Dynamics Missions Systems and Dedrone, the market leader in airspace security, announced their strategic counter-drone partnership, providing General Dynamics' global network with access to Dedrone's complete drone detection and defeat technology. As part of this strategic agreement, General Dynamics Mission Systems becomes a value-added reseller for Dedrone's counter-unmanned aerial system (C-UAS) capabilities and has made a significant equity investment in Dedrone. General Dynamics will exclusively supply Dedrone's counter-drone technology to their global defense, civil government, intelligence, and critical infrastructure customers.

"The intrusion of private and restricted airspace by unmanned aerial systems is one of the fastest-growing threats facing our customers, and Dedrone's counter UAS technology platform is the market-leading solution to defeat those threats," said Chris Brady, president of General Dynamics Mission Systems and a newly appointed member of Dedrone's advisory board. "We're excited to partner with Dedrone to provide counter-drone capabilities to our global customer base."

In the counter-drone technology market, Dedrone's exclusive focus on C-UAS detection and defeat have enabled them to become the industry leader with the rare distinction of having production systems fielded and in operational use worldwide. The Dedrone C-UAS technology portfolio combines machine-learning software with best-in-class hardware sensors, electronic attack methods such as smart jamming, and defeat weapons to provide early warning, classification of, and mitigation against drone threats. Dedrone's capabilities are used by hundreds of customers globally, including the U.S. military, allied and coalition forces, correctional facilities, airports, utilities, and corporations, as well as other public and private organizations.

"Dedrone is thrilled to be partnering with General Dynamics Mission Systems, a leader in building smarter mission-critical products and systems," shares AadityaDevarakonda, CEO of Dedrone. "With General Dynamics, Dedrone's technology will reach a broad, global customer base, opening opportunities to provide mission-critical airspace security systems to customers both in the U.S. federal and defense sectors, as well as their global critical enterprise security customers."

With Its Newest Acquisition East West Aeronautical Predicts Drone Market Will Soar

Recently, the FAA gave Amazon approval to use Unmanned Aerial Vehicles (UAVs), or drones, to deliver packages to its customers. New developments in aviation, sensing, and software technology have powered a revolution in unmanned flight. In the next decade, the burgeoning commercial drone industry is projected to generate more than $82 billion for the U.S. economy and, by 2025, could support as many as 100,000 fulltime career jobs.

Captain Eric Robinson, a jet airplane and helicopter pilot with East West Aeronautical (EWA), was once a fierce opponent to Unmanned Aerial Vehicles (UAVs otherwise known as drones) and is now convinced they are a positive benefit to the aviation industry. Captain Robinson, CEO of EWA, has recently purchased a franchise from Arcadia Aerospace-EU to sell, support, and eventually manufacture UAVs here in the U.S. Arcadia Aerospace has an innovative product line of UAVs in Belgium, which also includes a Space Drone design.

Despite his earlier reservations, Robinson explains, "I was not a fan of drones because I thought they would replace pilots; however, I have come to realize, in fact, that drones have increased the career options for pilots. Other professional aviators, including Aircraft Mechanics, Air Traffic Controllers, all come with some of the skill sets needed to fly Industrial sized drones," suggested Robinson. The projected need for career drone Pilots by the U.S. Department of Labor is far greater than any other pilot job, not to mention UAV mechanics and technicians."

Industrial drones come with sophisticated software that increases pilot proficiency.

However, Captain Robinson asserts, "despite the claims of Amazon and other the big computer companies regarding Artificial Intelligence (A.I.) I believe aircraft will always require a pilot unless a computer can be developed with feelings and intuition." Robinson adding his insight after decades of flying, "the decision-making matrix of the pilot, knowing their machine, and their environment is way too complex for a computer alone. "Without an algorithm for inventiveness and instinct, a computer will not be able to replace a pilot."

Today, drones' can be used for regular police patrols in our neighborhoods, keeping an eye-on other safety-sensitive facilities across America. Professional industrial drones are perfect for patrolling power lines, pipelines, oil refineries, and can make a big difference in monitoring our infrastructure, including addressing our aging bridges. The need for more drones to meet our industrial & security needs are on the rise.

However, Robinson interjected, "East West Aeronautical is thinking of new ways to use drones every day!" Even though Amazon might be delivering packages by drone soon, drones are vastly underutilized in other important ways. Many security professionals believe we should have UAV's circling over every sensitive facility in America.

The Military is finding new ways to utilize civilian industrial drones and have decided it is much more efficient to hire a local company and its pilots rather than transport expensive military drones and pilots from far away. Industrial drones having higher speeds and payloads compared to hobby drones' amount to a growing opportunity for aviators to start a small business and participate in supplying an essential service to the Military and to local industries.

RADA Announces $10 Million in New Orders since mid-July 2020

RADA Electronic Industries Ltd.announced the receipt of $10 million in accumulated new orders since mid-July 2020. To date, the aggregate amount of new orders since the beginning of 2020 has reached $59 million, compared to $35 million received for the same period in 2019, demonstrating an increase of over 68% year-over-year.

Out of the $10 million new orders, 70% were for RADA's growth-engine, software-defined tactical radars, for counter UAV and counter fires (C-RAM). Most of the new radar orders were follow-ons from existing customers. Deliveries of these orders are planned to be concluded within the next six months. The rest of the orders were for digital video recorders and debriefing stations for fighter aircraft, along with maintenance orders for RADA's avionics installed base.

RADA reiterates its recently increased guidance for 2020, provided on August 11, 2020, with revenues expected to grow to over $70 million and representing an increase of over 58% year-over-year.

DovSella, RADA's CEO, commented, "We are very satisfied with the continuous growth of new orders. We expect that by year-end this sustained growth rate of new orders will establish significant backlog for 2021. While our radars' business is growing at a significant rate, the repeated orders for avionics from our loyal customer base also ensure stability of this business of ours. We reiterate our expectations of sequential quarterly growth and growing operating profit throughout the remainder of 2020 and into 2021."

Martin UAV Contracted to Support Deployed Marines

Martin UAV has been awarded an Other Transaction for Prototype Agreement with the Marine Corps Systems Command to support the Marine Corps Warfighting Laboratory's Organic Reconnaissance, Surveillance and Target Acquisition (Airborne) effort with a Contractor Owned/ Contractor Operated V-BAT UAV system.

The Martin UAV V-BAT UAV will facilitate the Marine Corps objective to develop Tactics, Techniques and Procedures for V-BAT operations in an operational environment over an extended period.

Martin UAV's CEO Ruben Martin commented, "The V-BAT was purpose-built from the ground up to support deployed operations and simply has no equal in the maritime domain. We are excited to hear what the Marines and Sailors in the Amphibious Ready Group think about employing the system, and to see what novel uses they come up with. I have no doubt they will think of things that haven't occurred to us."

New Aerial Surveillance Capabilities with IMSAR's NSP-7 Synthetic Aperture Radar on a Primoco UAV One 150

IMSAR and Primoco UAV have successfully performed integration and preliminary flight testing of the NSP-7 Synthetic Aperture Radar on the Primoco One 150 UAV. Live flight tests in the Czech Republic verified the aircraft performance and confirmed flight endurance of up to 10 hours. With the SAR radar installed on the portside of the fuselage, the payload bay remains unobstructed and allows simultaneous installation and operation of the EO/IR surveillance system. With the multi-sensor capability, the system can be used for border monitoring and maritime patrol, Intelligence Surveillance and Reconnaissance (ISR) missions, wide area mapping, and for Humanitarian Assistance and Disaster Relief (HADR) support, all for a fraction of the operational costs of manned platforms.

The NSP-7 is a low-Size, Weight, Power and Cost (SWaP-C), multi-mode Ku-band radar system. It is packaged in an easy-to-integrate, weatherized pod form factor. The radar performs several modes, including high resolution synthetic aperture radar (SAR) imaging, magnitude and coherent change detection (MCD/CCD), and ground and maritime moving target indicator (GMTI/MMTI). The system functions day or night, in all weather conditions, and in other low-visibility conditions such as those caused by fog or smoke.

Larry Moore, Vice President at IMSAR said, "We're very impressed with the Primoco UAV team and the rapid innovation with high quality they've demonstrated in installing and flying our NSP-7 radar. The end result is a sensor and aircraft pairing that gives operators a powerful multisensor ISR capability."

The Primoco One 150 UAV is a medium weight UAV with 150 kg maximum take-off weight with fully automated operation, which is wholly produced by the OEM including its unique four-stroke four-cylinder engine. The advanced engine with low fuel consumption allows unnoticed operation due to its low noise footprint. The UAV has broken several records in endurance and range of control.

Primoco UAV SE CEO, Mr. LadislavSemetkovský, commented on the integration: "We are proud to announce that we have integrated the NSP-7 on the One 150 UAS, and plan to start commercial proposals offering a multi-sensor UAS package in an economical, ready-to-fly solution with unbeaten parameters. Selecting IMSAR NSP-7 was a natural choice for us, given the superior performance of the radar allowing the fulfillment of a wide variety of use cases. We appreciate the superb support of IMSAR throughout the integration process."

Red Cat to Acquire Fat Shark Expands Presence in the First-Person View (FPV) Drone Business

Red Cat Holdings, Inc. announced the signing of a definitive agreement to acquire Fat Shark Holdings, the market leader in FPV headsets. The transaction, subject to customary conditions, is expected to close on or before November 1, 2020.

Founded in 2007, Fat Shark is the leading provider of headsets and goggles for professional racers and drone pilots with an estimated market share of 85%. Fat Shark is presently generating approximately $7 million (unaudited) in annual revenues which will significantly increase the revenue base of the combined companies. This transaction follows the Company's acquisition in January 2020 of Rotor Riot, a leading provider of FPV and drone racing hardware.

"Our expected acquisition of Fat Shark strengthens our position by providing direct access to premier FPV technology favored by professional racers and drone enthusiasts alike. The combination not only provides a fully-integrated supply chain but adds design and development capabilities as well as international manufacturing and distribution. Greg French and Allan Evans bring world-renowned skills and decades of experience to our team. Fat Shark's existing digital platform and innovation also provides a valuable road map to fuel our future growth and our expansion into the enterprise drone market" stated Jeff Thompson, CEO of Red Cat. "Importantly, it positions us to continue to develop and introduce innovative products and solutions as commercial applications of drone technology expand in the coming years."

"Red Cat has emerged as a leader in the FPV sector of the drone industry and we are excited to join their growing team of business professionals" noted Greg French, founder and CTO of Fat Shark. Added Allan Evans, CEO of Fat Shark "We are excited to partner and integrate feedback from the top pilots at Rotor Riot as we develop and expand our digital video systems. Rotor Riot is especially well situated to help us build better FPV products as well as expand into enterprise training and field solutions."

"With the addition of Fat Shark to Red Cat's portfolio we have paired a quality hardware base with Rotor Riot, a robust educational/ entertainment brand" stated Chad Kapper CEO of Rotor Riot. "Fat Shark's new line of digital headsets with their "out of the box" functionality meshes perfectly with our popular "Ready To Fly" (RTF) packages. We are excited to promote their functionality on our YouTube channel and our digital store at www.rotorriot.com as well as leverage the strong brand recognition Rotor Riot enjoys. We believe the addition also allows us to continue expansion into the emerging gaming and augmented reality (AR) markets with future innovative products."

Transport Canada Approves Beyond Visual Line of Sight (BVLOS) Commercial Drone Operations with Iris Automation's Casia Safety Technology

Transport Canada has issued the second Special Flight Operations Certificate (SFOC) for Beyond Visual Line of Sight (BVLOS) flights in uncontrolled airspace utilizing infrastructure masking and Iris Automation's onboard detect-and-avoid (DAA) solution to MVT Geo-solutions.

Under this SFOC, MVT, the UAS Center of Excellence (CED Alma), and Iris Automation will partner to conduct commercial missions over linear power lines in Alma, Quebec. Approval was granted to include the utilization of Iris Automation's DAA system, Casia, which provides commercial drones with automated collision avoidance maneuvers.

These flights will mark the partnership's first BVLOS flights outside of the CED Alma test range that will leverage onboard DAA for air risk mitigation and does not require ground-based visual observers or radar. It is the second BVLOS waiver the partnership has secured in Canada, with the first waiver being limited to flights within the Center of Excellence's controlled airspace.

BVLOS flights unlock autonomous drone use for economically beneficial commercial applications including infrastructure inspection, mining, mapping, agriculture, emergency response, and package delivery.

"This permission further demonstrates how the Casia onboard detect-and-avoid (DAA) system is helping to advance the safety case for drone usage while simultaneously expanding the envelope of drone-related use cases," said Jon Damush, CEO of Iris Automation. "Drones offer tremendous promise in terms of safety and economics as compared to piloted aviation alternatives, but we must integrate them into the airspace safely. Seeing and avoiding other aircraft is paramount to that safety, and steps like this are key to unlocking the promise of drones."

"Obtaining this Special Flight Operations Certificate (SFOC) is a first in Quebec," explains Mr. Alain Fortin, President of the UAS Center of Excellence. "As a Canadian pioneer in the civil and commercial RPAS industry, Alma's CED is proud to have contributed to the development of technologies and skills that speed up the advent of safe and well-integrated BVLOS flight in Canadian airspace."

Resulting flight missions from this approval will help inform more complex commercial operations in the future.

Volansi Launches Commercial Drone Delivery Program To Deliver Cold Chain Medicines In Rural North Carolina

Volansi, Inc., the leader in vertical take-off and landing (VTOL), middle-mile drone delivery services, announces it has begun a commercial healthcare drone delivery project in North Carolina.

In collaboration with Merck, known as MSD outside the U.S. and Canada, Volansi is piloting the delivery of cold chain medicines from Merck's Wilson, N.C. manufacturing site to VidantHealthplex-Wilson, a Vidant Health clinic, as the first of three phases in a project to learn about drone technology's role and ability to improve access to healthcare.

With 1.4 million people across 29 counties, eastern North Carolina's vast, rural environment can create challenges for accessing care. Initial flights in the project resulted in the first drone delivery of temperature-controlled medicines within the U.S.

"We've seen the world's supply chain strained like never before from the impact of Coronavirus," said HannanParvizian, CEO and Co-Founder of Volansi. "There's now an accelerated need for rapid advancements in supply chain technology, especially in healthcare. Drone delivery is one solution to getting critical supplies where they are needed, at the moment they are needed most."

The project utilizes Volansi's VOLY C10, an all-electric drone capable of carrying 10-pounds of cargo to locations up to 50 miles away. The VOLY C10's vertical take-off and landing (VTOL) system allows it to deliver fragile cargo with a "soft touch" automated release once the drone has landed at the delivery location. The VTOL system also requires minimal infrastructure to operate and is also capable of delivering on the returning flight items to support order confirmation like temperature trackers and shipping confirmation.

"As a healthcare leader, Merck is very supportive of collaborations using new technologies to explore how one day we could help better serve the healthcare community. Our existing distribution system is strong, and this pilot helps us explore new innovative delivery options that would complement our existing supply chain capabilities," said Craig Kennedy, Senior Vice President, Global Supply Chain Management, Merck.

"At Vidant Health, innovation and collaboration help us increase access to care and meet our mission to improve health and well-being across eastern North Carolina," said Brian Floyd, Chief Operating Officer, Vidant. "This project with Merck and Volansi is the beginning of an exciting endeavor to explore additional ways we can meet the unique needs of those we serve."

Volansi is collaborating with the Federal Aviation Administration's (FAA) Unmanned Aircraft System Integration Pilot Program and the North Carolina Department of Transportation to ensure that its deliveries are made safely and in accordance with state and federal guidelines.

Volansi will seek additional approval from the FAA to provide deliveries in additional locations, for phases two and three of the project, enabling a flexible, on-demand, and responsive supply of critical medicines.

Drones World Editor kartikeya In conversation with Mr. Ankit Kumar, Founder, Alternative Global

Mr. Ankit Kumar, the power that's driving the successful firm, Alternative Global. How did your professional career begin? How did Alternative Global achieve the heights it is now at?

I incepted Alternative Global 4.5 years back with the focus to become the leading consulting in the EV and Drone industry. At that time, EV and Drones were at a very nascent stage. We built a very solid and professional team, kept on working in the niche to provide opportunities to companies in the domain for successful ventures. As the industry picked up, we started gaining better momentum and soon became a renowned and trustworthy name in the market. Alternative Global today is the name for Go-to-Market for any new

venture entering in to the EV or Drone space or expanding to Indian market. We are working with over 100 companies globally on multiple fronts and in a way, lead the overall segment. The core focus at Alternative Global has always been to work in the futuristic domain. We are present in 4 countries now – India, USA, UK and Israel. Recently started investing in tech companies in the EV and Drone space too and foresee these two sectors to grow exponentially in the next 4-5 years.

What are the sectors that you are currently serving and what are the services that you are offering in the Drone segment?

Alternative Global is involved with the whole drone ecosystem. We help drone companies with technology tie-ups and collaborations from across the globe to expand footprint, work with regulators closely providing inputs where required, and help end user companies and state governments create a strategic roadmap for using drones for deliveries in health logistics, e-commerce logistics and food logistics followed by conducting PoC trials.

Unlike survey & inspection, surveillance, imaging etc., drone delivery vertical is still in a nascent stage in India and even in other countries, but has a compelling case of changing the way deliveries can be carried out in the future after BVLOS regulations are in place. Health logistics makes an immediate use-case for a country like India where many of the rural and remote areas lack the necessary healthcare facilities and we expect many of the state governments will be looking at this to extend the reach of medicines, vaccines and blood to poorly connected villages and PHCs. AGI is working with many companies and state governments to establish PoC for healthcare supplies delivery that, in time, can be scaled into a commercially viable business models.

Alternative Global
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With DGCA giving nod to BVLOS test flights, a few consortiums started their experimental delivery flights. Could you give us an insight into one such consortium, Dunzo Air?

As of now, DGCA has given permission for 100 hrs BVLOS trials to 20 consortiums. Dunzo Air Consortium was the first one to get the approval from DGCA in Feb 20 but due to lockdown the trials couldn't be started. Subsequently, in August, all consortia participating in these trials have been asked to obtain MHA clearance. We intend to start the trials as soon as MHA clearance is received. We are ready.

Dunzo is a very forward-looking organization with an intent to experiment with new technologies and leverage it if it makes a business sense. AGI had been asked by Dunzo to create and manage a consortium of companies and individuals bringing together different expertise to conduct BVLOS trials for delivery use-cases. We have brought together world's leading UTM provider AirMap, Skye Air – a company focused on drone deliveries and operations, Vodafone as MNO partner, AutomicroUAS as Safety Expert and TropoGo as the Insurance Partner. We are creating a strategic roadmap for drone inclusion in the given future.

What are the significant steps taken by the firms and governing bodies to ease and boost up drone delivery trials?

When do you think the last mile deliveries in India would be happening with drones?

MoCA, DGCA and AAI are very proactively working on enabling the drone regulations on the war footing, if I may say so. Mr. Ambar Dubey, Jt. Secretary, MoCA has often spoken at multiple forums that for the government, the priority sectors for drones enablement are ADHL (Agriculture, Disaster Relief, Healthcare, Logistics). Already drone standards and certifications are in place that will ensureProduct Certification under ISO 17065 and Criteria developed by QCI. With initiatives like Digital Sky, UTM Policy and CAR 2.0 will all bring ease of approvals, operation and clarity for widespread use of drones commercially in the coming years.

Companies in different verticals are gearing up to use the drone technology for their benefit in terms of efficiency, accuracy and cutting down in time and cumbersome processes that are to be undertaken with the earlier available solutions. Though VLOS operations are on and BVLOS trials are permitted on a conditional basis, wecanexpect the operations taking place once CAR 2.0 regulations are in place, air tunnels defined – from long distance pipeline and road inspections to medicine, vaccine & blood deliveries in remote and rural areas with poor connectivity, faster response time during disasters – the scope is limitless. Companies in healthcare logistics, e-commerce logistics, food logistics and many state governments are already ready to establish their use-cases by conducting pilots and we at AGI are really excited to help such companies and state governments with a detailed roadmap preparing these companies to be ready when the regulations permit. Telangana state with WEF has already floated an EoI to establish PoC for medicines, vaccines and blood deliveries between District Hospital and PHCs and we hope that it will soon get the necessary clearances and approvals from DGCA and AAI to proceed before the end of year. A successful PoC would then lead to a wider implementation across the state, benefiting countless villagers, generating employment and a faster delivery of treatment.

Any new technology takes time to get implemented through the wider spectrum. Last Mile Deliveries will also happen, but at a later stage, after regulators get confidence, operators gain experience, and the required infrastructure gets built. Initially, the deliveries would begin from Hub-to-Hub model and then this may get extended to last mile deliveries gradually. However, there are plenty of opportunities for the companies and drone operators in Hub-to-Hub deliveries that will help improve the operations of these companies.

Could you share something about you partnership with Incisive Law? How important is it for UAV firms to have a legal advisor by their side in the emerging space of Drone tech?

Drones are still an emerging technology with rapidly changing regulations and capabilities. Regardless of the application, the central issue remains: How will the laws be interpreted and applied in this uncharted territory? Given the ambiguities in the law, which had no warning of this technological

development, the brave new world of drones has spawned a legal niche. The niche will eventually become as large as aviation law because the widespread use of drones significantly exceeds the sphere of drone manufacturers or operators.

Drones have the potential to be disruptive technologies across a range of sectors and thus, businesses need to not only have a good commercial strategy, but it also means they need to take good care of compliance matters as the regulatory and reputational consequences of failing to do so can be severe. Being such a novel technology, regulations are changing at pace and it can be difficult to keep up with this rate of change.

Professional advice can help the players within the drone-tech space stay one step ahead of the game as the market evolves. In this respect, the partnership of AGI and Incisive becomes paramount. While AGI can advise the industry players on the commercial and operational side of things, Incisive Law LLC has significant experience in understanding and advising clients within the regulatory framework of the UAV industry and with both entities' presence in multiple jurisdictions, the AGI/Incisive collaboration is in a unique position to advise our clients on a multitude of issues under a single framework.

Where do you see the drone and EV markets heading globally? Is the case similar in Indian subcontinent as well?

The ball has just started rolling for these two sectors and it will only expand. The drone sector holds tremendous opportunities and has the potential to contribute four to five per cent to India's GDP.A recent report by the FICCI and Ernst & Young noted that the drone market in India will touch $885.7 million by 2021, when the global market size will be $21.47 billion (so only 3.8%). Another international report says that India will be by far the fastest growing commercial drone market in the world, by 2024 becoming the 3rd largest commercial drone market.The global drone market is estimated to grow from USD 14 billion in 2018 to over USD 43 billion in 2024 at a CAGR of 20.5%. So there is a tremendous growth potential and like any other new technology it will go through the typical curve starting from early adopters, maturing into a stable usage with widespread usage.

We are already seeing a growing adaptation in the EV sector in India and across the world. While China, Europe and USA are leading in this, with the aggressive policy push by the central and state governments we are now seeing a significant movement in India's EV sector. Though currently many player are jumping into the EV segment,we feel, during the course of next few years there will be a consolidation and weeding out of non-serious players. The true potential of EV & Drones will be seen once Indian companies get into backward integration from assembling the imported components to component-level manufacturing and then we can really claim to be "Atmanirbhar Bharat"and be the hub for world's manufacturing and compete with China.

What segments of the Drone industry do you think are going to see significant developments in the next 5-10 years?

Besides Inspection & Survey, that is already happening, surveillance, transportation and Agricultureverticals hold a high promise. The drone logistics and transportation market is estimated to be USD 11.20 Billion in 2022 and is projected to reach USD 29.06 Billion by 2027, at a CAGR of 21.01% from 2022 to 2027.The <10kg (Delivery Drones) segment is estimated to lead the drone logistics and transportation market in 2022. I think there will also be a big demand on integration of AI, Blockchain and other software solutions in each of the drone related verticals and would be a good place to be in for companies in IT.

Another emerging sector is UAM (Urban Air Mobility) which will change the way people travel in next 5~10 years. Many companies across the world are working on this and already successful trials have been conducted by Volocopter and a few others. Indian companies are not far behind and already working on prototypes of UAM vehicles. UAM will require a whole new way of thinking in terms of regulations, safety aspects and the support infrastructure.

Do you have any advice for theemerging drone firms in getting the most out of their investment?

Our view and advice to the emerging drone companies is that instead of looking everything through the lens of technology, become a solution centric entity. Technology is a tool and drone is only a platform. Only when you solve a real problem or a pain-point of the user then one can expect success. Often, entrepreneur fall so much in love with the technology that they start solving imagined problems instead of the real problem and then wonder why they are not getting the traction, even with lot of admiration for their technology. The other area the companies should focus on the quality of their products and services – don't be known for your products because these are cheap but be known for providing value for money.

Drone Racing League Brings On NBA Champion Chris Bosh To Lead New STEM Initiative For 2020 Season

The Drone Racing League (DRL), the global, professional drone racing property, teamed up with 2-time NBA Champion and 11-time NBA All-Star Chris Bosh ahead of their 2020 DRL Allianz World Championship Season, which started on October 21st at 9pm ET on NBCSN, Twitter, and Facebook Watch. Appointed as Dean of DRL Academy, Bosh will lead the league's STEM program to inspire the next generation of technologists and digital athletes while advancing diversity and inclusion in tech and sports.

DRL Dean Bosh and 2-time DRL Allianz World Champion Pilot JET will teach kids about the science behind the sport of high-speed drone racing through a newly launched fun, educational content series. Classmates tuning in can test their new learnings in the DRL SIM, an immersive drone racing game on Xbox and Steam that teaches players how to build and fly drones through interactive training missions. They can also watch the pros put DRL Academy lessons to real-world use: The 2020 Season features the best drone pilots in the world competing in the DRL SIM.

"Our sport is for infinite learners — and as parents continue to navigate the new playing field of education, we're excited to offer dynamic STEM programming to supplement remote learning. DRL Dean Bosh had a championship career in the NBA, and he is bringing that same enthusiasm, intensity and dedication that he showed on the court to our DRL Academy. We look forward to inspiring kids together about science and technology on the fly," said DRL President Rachel Jacobson.

Bosh, who studied at Georgia Tech before dominating the game of basketball, will bring his passion for technology and sports together as DRL Dean.

"I love engineering and technology and believe every kid should be given access to STEM education. With this year's school closures, I became Principal Bosh for my five kids at home — and now, I'm thrilled to announce my promotion to Dean Bosh, and help kids around the world learn about science through the fun, high-tech, family-friendly sport of the Drone Racing League," Bosh added.

With a new playing field of school back in session, DRL Academy is the new recess.

skyBOX: Credit-Card-Sized, Wireless SSD Storage – by Hyper Accessory

SkyBOX, the all-in-one, portable SSD storage with built-in Wi-Fi 6 technology and universal compatibility, ensures effortless streaming and backup of photos, videos, and music files from and to any mobile devices, cameras or drones. It is a must-have for photographers/videographers/ content creators who travel light without laptops.

skyBOX is just about the size of a credit card. It will fit in a pocket or bag easily so that it is easy to back up devices anywhere. Backing up the internal storage of a device or an SD card only takes one touch and a minute, thanks to the Wi-Fi 6 technology and extreme transfer speed up to 2200MB/s. Wi-Fi 6 can transfer 40% faster than current Wi-Fi 5. Internal SSD is available from 512GB to 4TB as options.

Besides being an excellent backup, skyBOX allows seamless wireless streaming to multiple devices. With additional access through its own skyBOX App and other third-party apps, users can browse, stream, edit, and share the files with mobiles, iPads or laptops anywhere. Lastly, the optional SkyCloud Dock can convert skyBOX into a personal cloud just by plugging it in. Users can leave skyBOX at home and still access the files when on the go. Users will find skyBOX to be the smallest and fastest wireless drive.

skyBOX is available for pre-order on Indiegogo now

Starting from $99 (50% off MSRP) for the 512GB pack to a $479 4TB pack that includes a skyBOX Pro and a SkyCloud Dock.

Blighter launch pioneering drone-seeking A800 3D Drone Detection Radar

Blighter Surveillance Systems the British designer and manufacturer of electronic-scanning radars and surveillance solutions, has launched the latest in its range of market-leading radars, the A800 3D drone detection radar for land, air and sea surveillance.

The radar's main function is to detect and locate commercial 'hobby' drones in 3D space. Its optimised air security mode provides a unique ability to search for low-slow-small (LSS) threats caused by the misuse of small drones including the commonly-used 'DJI Phantom' style quadcopters. An Artificial Intelligence based micro-Doppler target filtering feature helps to reduce false alarms and improve the detection of multicopter and winged drones.

"We continue to develop and extend our product range to keep Blighter at the forefront of radar capability and to meet the growing global need for effective technical solutions to counter the malicious use of drones," said Angus Hone, CEO of Blighter Surveillance Systems. "The new A800 tri-mode 3D radar offers revolutionary capabilities by performing precision surveillance in three complex environments at once using a single, cost-effective sensor."

The A800 3D drone detection radar is designed to provide the earliest possible warning of incoming threats, by looking well beyond and above the perimeter. Its rugged design allows it to operate in harsh conditions and temperatures, from -32°C to 65°C. An extended operating temperature version is also available. It can be mounted onto tripods and quadpods, land vehicles and trailers and fixed towers and masts for surveillance in a wide variety of settings.

A wide variety of industry standard interfaces are supported by the A800 including high grade encryption, and a software developer's kit (SDK) is also available for download.

Power Vision's Power Egg X Brings Artificial İntelligence (Aİ) to Video Conferences

PowerVision Robot Corporation, a global leader in smart drones, artificial intelligence, virtual reality, and augmented reality, has added an Artificial Intelligence (AI) video conferencing camera mode to its innovative, PowerEgg X multi-purpose drone. Its unique modular design with detachable arms allows the PowerEgg X to turn into a video camera in just one snap. Simply attach the versatile unit to the included tripod mount, connect it to a standard tripod, or set it near a digital device. Compatible with popular platforms such as Zoom, Microsoft Teams and Webex, users are no longer tied to their desks and are impressing classmates or meeting attendees aplenty.

"The PowerEgg X's AI video conferencing camera capabilities fit very nicely in the worlds of distance learning, business meetings, job interviews, daily work tasks, and many other activities," said Wally Zheng, Founder, and CEO of PowerVision. "Its 4k/60fps output and three-axis gimbal produce crystal-clear, stunning 12-megapixel images make it perfect for such applications. When combined with Artificial Intelligence and facial recognition technology, users are no longer stationary and are free to move about while the camera tracks them."

PowerVision is keenly aware that the COVID-19 pandemic has drastically changed the way people live. Dining room tables have become classrooms, small living room corners have been transformed into conference rooms or private offices. Even massive lecture halls and trade show floors have transformed into virtual platforms.

The company's PowerEgg X – designed to provide quality, ultrahigh-definition images – has been for a while, and remains, at the forefront of video communications.

The PowerEgg X webcam allows fidgety students to fidget, meeting presenters to walk freely about in discussing visual aids and gives meeting attendees the ability to get up and stretch or move around without disappearing off camera. Its special facial recognition, deep learning, and a tracking field of view up to 170° keep subjects in the middle of the frame at all times without repositioning the unit.

Users who find their hands full can begin or end their video participation with a simple hand or body gesture. Through deep learning, based on a database of gestures, the PowerEgg X supports multi-gesture intelligent recognition for a variety of functions.

In addition to the AI video conferencing camera mode, PowerEgg X also includes Autonomous Personal AI Camera, Handheld Gimbal Camera, or Smart Drone modes. In drone mode, the PowerEgg X is a professional tool for aerial photography and videography. The drone features a flight time of 30 minutes, automatic obstacle avoidance, precise landing, intelligent flight modes, wind speed resistance up to 20 knots (19-24 mph), 1080P image transmission within a distance of 3.7 miles, and much more. With additional accessories, the drone can also fly in rain, land and take off from water – making it the only camera users will need regardless of where their adventures take them.

Three years in development and with over 100 technology patents, the PowerEgg X is truly a one-of-a-kind, multipurpose smart device.

Pricing and Availability

The PowerEgg X with AI video conferencing camera mode starts with an MSRP of $899 and is available at BestBuy.com, B&H Photo, Amazon.com, Powervision.me, and PowerVision dealers.

HCSS Launches a New Version of HCSS Aerial

A new version of HCSS Aerial, a cloud-based solution for continuous monitoring of infrastructure construction projects, has launched. This version adds additional features to make job site mapping and data visualization easier and more effective.

HCSS Aerial users in the heavy civil industry already benefit from the ease of use and survey-grade accuracy levels of drone-based surveys. HCSS Aerial provides accuracy of 1/10ft (3cm) from independent checkpoints across small and large survey areas.

The software works with the latest generation of drones for professional applications, and transforms large numbers of images into accurate point clouds, DSMs and orthomosaics.

HCSS Aerial customers use the platform to track execution progress with the ability to compare "digital twin" models of the job site from different dates and against the design. Site documentation and reports are generated in 24 hours, not weeks.

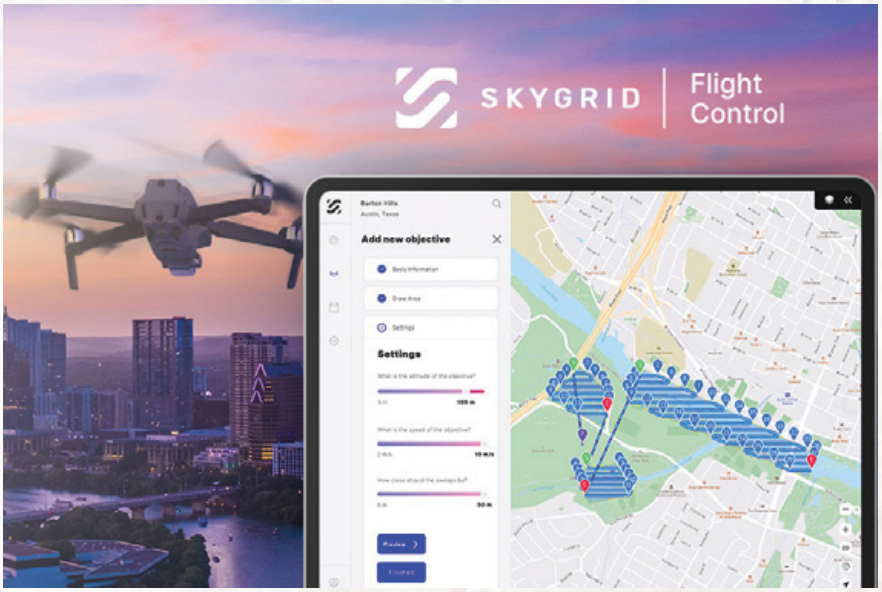
Customers use volumetric calculations and analysis as progress indicators of projects and track earthwork quantities more accurately to avoid mistakes like underestimating or overestimating material and cut vs. fill.

One new feature is Enhanced Accuracy Report and Checkpoints Support, which validates model accuracy without the need for expensive hardware, providing detailed information listing checkpoints' and GCPs' information, residuals, and errors.

This version also offers Local Coordinate System Support for geo-referencing and seamless workflow integration, and Terrain Filtering capabilities for more accurate volumetric measurements. Also added was Image Validation to check integrity of images selected for uploading and look for gaps. Issues are shown as warnings with the option to ignore or fix as needed.

"It's very exciting to add HCSS Aerial to our portfolio and offer 3D mapping and analytics capabilities tailored to our heavy-civil customers," said JP Giometti, HCSS Executive Director, Global Strategy and Corporate Development. "With HCSS Aerial, surveyors and contractors can quickly collect aerial survey data, create high-quality 3D models, and access data visualization and measurement tools across the project lifecycle, helping them make better decisions."

HCSS has announced plans for more features in 2020, including integration among HCSS products; a flight planning drone app enabling automated data capture from the construction site; and automatic Identification of Elements & Objects using AI and machine learning to identify manholes, utility poles, railways, etc., and quantify them for tracking, analysis, and design comparison.



SkyGrid Launches All-in-One Drone App to Automate Every Phase of Flight

SkyGrid, a Boeing, Spark Cognition Company, launched a new application for drone operators and enterprises to automate every phase of flight in one unified solution. Now available for free in the iPad App Store, SkyGrid Flight Control™ simplifies mission planning and execution, allowing drone operators to autonomously surveil a defined area and detect objects in real-time. Powered by artificial intelligence (AI) computer vision, the solution enables more efficient search and rescue missions, disaster response, perimeter surveillance, site inspections, and more.

"Traditionally, drone operators have used several different tools to check airspace, get LAANC, plan and execute flights, and gather insights, but it's a manual, cumbersome process," said Amir Husain, CEO and founder of SkyGrid. "Recognizing this challenge, SkyGrid has minimized the burden on drone operators by creating one solution that automates airspace, flights, and insights. As the only drone solution built on AI and Blockchain technologies, we give operators and enterprises the assurances they need to execute safe, compliant missions."

Powered by SkyGrid'sAerialOS™, SkyGrid Flight Control enables drone operators to automate airspace authorization, mission planning, flight execution, and object detection in one end-to-end solution. The following features and functionality are available for free within the iPad application:

- Airspace intelligence: Provides a map of airspace classes, boundaries, temporary flight restrictions, notices to airmen, and other advisories.
- Ground intelligence: Displays population density, obstacles, elevation, and more.
- Advanced weather data: Details hyper-local precipitation, wind speed and direction, temperature, cloud cover, and more.
- Real-time airspace authorization: Automates authorization to fly in U.S. controlled airspace under 400 feet through integration with the Federal Aviation Administration's Low Altitude Authorization and Notification Capability (LAANC) 4.0.
- Automated mission planning: Automatically generates area exploration, waypoint, and multi-objective missions based on custom flight parameters, such as desired speed, altitude, and location.
- Autonomous flight execution: Autonomously launches the drone and performs the pre-defined flight plan.
- AI object recognition: Detects objects in real-time as a drone surveils the defined area with AI computer vision.

More advanced enterprise features are also available for organizations to better manage all drones, pilots, and airspace operations. These features include AI-based mission planning and rerouting, multi-drone missions, custom object detection and counting, geofencing and alerts, and more.

"SkyGrid Flight Control is an important stepping-stone to enable more complex commercial drone operations and advanced air mobility in urban, regional, and global markets," said Steve Nordlund, vice president and general manager of Boeing NeXt and executive board advisor of SkyGrid. "SkyGrid is solving complex problems in unmanned aviation with a system that will safely integrate the future volume of drones, passenger air vehicles, and other autonomous aircraft in the global airspace."

SynQor® Announces New Additions to its Mil-COTS 270 Vin DC-DC Product Family

SynQor, Inc., announces the latest additions to its Mil-COTS 270 Vin DC-DC product line. These new compact, high efficiency, high power, full brick DC-DC converters are based on SynQor's next-generation, isolated, fixed frequency synchronous rectifier technology. The impressive power density of the modules helps optimize space in an industry where space is at a premium. The MIL-STD-704 compliant converters are able to down-convert a 155-425 V input voltage range to an adjustable output between 10-40 Vdc for the MCOTS-C-270-40-FE or 25-60 Vdc for the MCOTS-C-270-60-FE.

These converters also have an adjustable current limit feature that allows them to power unlimited capacitive loads or a battery. When the load current demand is above the set current limit, the unit behaves as a constant current source delivering constant current independent from the output voltage. When operating below the set current limit, the unit behaves as a regulated voltage source delivering a fixed regulated voltage to the load. The designer can select the output voltage through trim resistors or by adjusting the voltage into the voltage set pin. The converter is designed to provide extremely high-power conversion at high efficiency throughout the entire output power range. The low power dissipation characteristics of these encased bricks allow designers to deliver full power to the load at baseplate temperatures as high as 95 °C.

The highly flexible encased modules, designed to operate in the harshest military conditions, are well suited for applications like radar/pulsed loads, battery charging, electronic warfare, RF power amplifiers, solid-state lasers, UAV/UUVs, rotary wing applications, and much more. The converters also include an advanced set of features like serial communication for module configuration and monitoring, integrated active current share for paralleling applications, an external clock synchronization to improve EMI performance, and a battle short feature that overrides the over-temperature shutdown feature in case the designer needs to continue to operate the unit past its intended temperature range. SynQor's field-proven, highly reliable technology shortens design cycles and helps designers/integrators yield reliable, dependable solutions for the very competitive military markets.

Features

- High Power density:
- Up to 1000 W / 60 A for MCOTS-C-270-40-FE
- Up to 1000 W / 40 A for MCOTS-C-270-60-FE
- Wide input range: 155-425 Vdc
- High efficiency: 94%
- Variable output voltage
- Programmable current limit

Specification Compliance

- MIL-STD-704 (A-F)
- MIL-STD-461 (C-F)
- MIL-STD-810G

AI Innovators Announce FCC Certification for Contactless Social Distancing Monitoring Deployments At Scale

Ainstein AI, Inc., a radar technologies company headquartered in Lawrence, KS has obtained FCC certification for its 60GHz IoT radar sensor. WAYV Air is a short-range mmWaveIoT Sensor designed specifically to collect and provide data about moving objects within a targeted area.

"The WAYV Air starts by recognizing if there is activity happening within a space such as a conference room, restroom, corridor, or open space. Beyond it's capabilities for occupancy detection, we can also evolve into collecting and then sharing data about where people are spending their time in the space. For example, we can present a utilization heatmap, people count, or other information to building managers, hoteliers, enterprises, manufacturing plants, restaurants, medical facilities, etc. This data can be used to improve safety and enhance employee and visitor experiences within a space" -Andrew Boushie, Vice President of Strategy and Partnerships, Ainstein.

As for competitors in the market, "Radar development is tough. Fortunately, we've built a very talented team that works really smart. They have enabled Ainstein to be early to the market in providing a 60GHz people sensing module with FCC approval. mmWave radar is the future of indoor sensing. Our radar sensors help our clients to understand occupancy density, space utilization, and social distancing without invading someone's privacy. This is something other sensing technologies simply can't provide at scale." -Andrew Boushie, Vice President of Strategy and Partnerships, Ainstein.

The WAYV Air is used for a number of applications:

Social Distancing, Space Utilization, Crowd Density Management, Social Distancing and Reduction of Friction Points within Social Spaces, Patient Monitoring, Fall Detection, Vital Sign Detection, and more.

DJI Unveils First Integrated Lidar Drone Solution And A Powerful Full-Frame Camera Payload For Aerial Surveying

DJI, the world leader in civilian drones and aerial imaging technology, unveiled at INTERGEO, two new payload solutions for its flagship commercial drone platform Matrice 300 RTK, destined to serve the most demanding aerial surveying missions. The DJI Zenmuse P1 and DJI Zenmuse L1 are set to be game-changers for the industry, bringing more efficiency and new perspectives at an affordable cost without compromising the quality and accuracy of the data collected for precise aerial inspections and data collection missions.

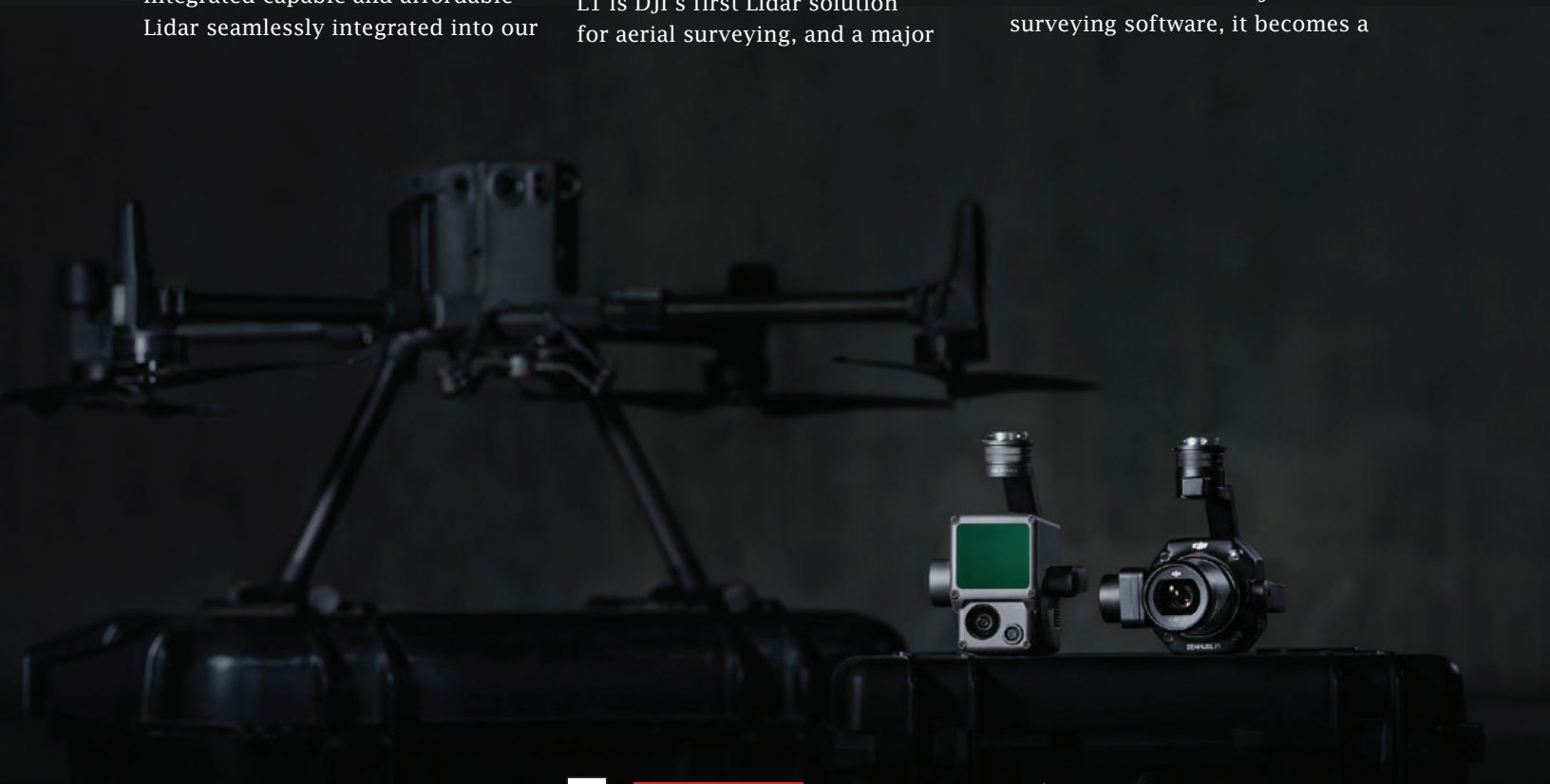
"With these two new payloads, we are providing an all-integrated complete solution to our enterprise customers active in accurate geospatial data acquisition," said Arjun Menon, Engineering Manager at DJI in the US. "Having a fully integrated capable and affordable Lidar seamlessly integrated into our best commercial drone is a dream that becomes reality for surveying, mapping and construction professionals. They will be able to see, cover and understand the geospatial context from a totally new perspective thanks to the high level of accuracy and quality of the data collected from these tools in the sky."

DJI Zenmuse L1 – DJI's First Lidar Solution For Aerial Surveying

In the aerial surveying industry, Lidar technology plays a vital role in building accurate reality models. In low light situations, or in areas with heavy foliage where traditional drone-based photogrammetry methods would fall short, Lidar can provide quick, precise true-color point cloud models of complex structures. The Zenmuse L1 is DJI's first Lidar solution for aerial surveying, and a major breakthrough in democratizing Lidar technology by being easy to use and accessible.

The Zenmuse L1 integrates a powerful yet ultra-lightweight LivoxLidar module with a 70° FOV, a high-accuracy IMU, and a 20-megapixel camera with a 1-inch CMOS sensor and a mechanical shutter on a 3-axis stabilized gimbal. The Zenmuse L1 can generate true-color point cloud models in real-time, or acquire a vast area (up to 2 km2) of point cloud data in a single flight. With a Point Rate of 240.000 points per second and a detection range of 450 meters, the ease and speed of capturing quality Lidar data is unprecedented. The module supports both Line Scan Mode and Non-repetitive Scanning Mode, a unique technology developed by Livox. This will provide full coverage of the area of interest in very short amounts of time, and allows the sensor to capture data in any direction, instead of along a defined plane.

When used with DJI's flagship commercial drone platform Matrice 300 RTK and DJI Terra surveying software, it becomes a



complete and versatile solution that gives the user real-time 3D data throughout the day, efficiently capturing the details of complex structures and delivering highly accurate reconstructed models. Thanks to its IP44 rating, The Zenmuse L1 can operate in rainy or foggy environments while the Lidar module's active scanning method enables flights in low light conditions.

The LivoxLidar's unique non-repetitive scanning process allows the sensor to capture data in any direction, which is critical for mapping applications. The Zenmuse L1 Lidar solution can easily penetrate vegetation canopies and foliage. Agriculture and forestry managers will benefit from insights such as canopy width, vegetation density, area, stock volume and growth trends. Emergency responders can gather critical insights using true-color point clouds, gain situational awareness and capture forensic intelligence in real time for informed decision-making. The Zenmuse L1 can be used throughout asset-intensive, high-risk and hazardous environments, including in oil and gas, mining, infrastructure, telecommunications and power.

DJI Zenmuse P1 – Full Frame Photogrammetry – The New Benchmark For Aerial Surveying

Over the past few years, DJI Enterprise has dedicated significant efforts and commitments to professionals from the Architecture, Engineering, Construction and Surveying industries. Experts have adopted drone technology and naturally turned to the DJI P4 RTK's capability to capture data for centimeter-level accurate maps and models for a range of applications, from cadastral surveys to natural heritage site models.

Today, DJI pushes the boundaries of its vision for the industry by elevating aerial photogrammetry to an unprecedented level of accuracy, performance, and high-precision work. The new DJI Zenmuse P1 is the most powerful DJI camera payload dedicated to geospatial data acquisition. It integrates a 45-megapixel full-frame low-noise high-sensitivity sensor offering flexible viewing with interchangeable 24/35/50mm fixed-focus lenses on a 3-axis stabilized gimbal.

The DJI Zenmuse P1 provides high accuracy without Ground Control Points (3cm horizontally / 5cm vertically) and high efficiency as it is able to cover 3 km2 in a single flight.

Equipped with a mechanical shutter and the all-new TimeSync 2.0 system, which synchronizes time across modules at the microsecond level, the Zenmuse P1 lets users capture centimeter-accurate data combined with real-time position and orientation compensation technology.

The Smart Oblique Capture feature dramatically improves efficiency, mimicking a multi-sensor oblique camera, and only capturing the photos essential to the reconstruction at the edge of the mapping areas.

Adopting the DJI Zenmuse P1 will offer a new edge to photogrammetry professionals, enabling them to work faster thanks to its unique features. They will be enabled to conduct complex missions requiring 2D orthomosaics, collect oblique images for 3D modeling with centimeter-level accuracy, and acquire ultra-high resolution image data of vertical or slanted surfaces from a safe distance that faithfully recreates fine textures, structures, and features for detailed reconstructions, geological surveys, heritage site conservation, hydraulic engineering and more. Teams will also be able to work on real-time mapping missions gathering geographic information using DJI Terra.

Price and Availability

The DJI Zenmuse L1 and DJI Zenmuse P1 are available for pre-order from official DJI Enterprise dealers worldwide and will start shipping in early 2021.

Unmanned Traffic Management a Panacea for future Drone Ecosystems

Introduction

As we postulate the future of RPAS or Unmanned Aerial Systems (UAS), the demand for a secure airspace in the otherwise uncontrolled zone becomes increasingly critical. There is thus a fundamental need for an organised approach to enable these operations in the interest of aviation safety and efficiency. Currently light aircrafts, gliders, and helicopters operate in the low altitude uncontrolled airspace. However over the last decade commercial drone applications have expanded phenomenally in disparate sectors, from agriculture to power, telecom, railways and a host of commercial operations extending to Urban Air Mobility (UAM) services. As a result of such consistent proliferation of drones, it has become increasingly imperative to develop a solution that will enable their efficient and seamless integration with the air navigation service providers (ANSPs) operating in controlled or uncontrolled airspace from a safety perspective.

In this context it may be pertinent to mention that several industry's dependence on commercial UAS applications have sprung up due their versatility in operations leading to significant savings in cost and time. Most drone services operations are in the visual line of sight (VLOS) such as inspections of cell phone tower,

Maj Gen G Shankar (Retd)

solar panels, Oil & Gas pipelines etc. However, many commercial unmanned aerial systems (UAS) operators would like to fly their missions beyond visual line of sight (BVLOS) where economic value is greater as compared to using conventional modes of logistic transportation. In fact it goes without saying that BVLOS drone operations will significant rise in the coming days given their economy of scales particularly in far flung and inaccessible areas. In addition autonomous capabilities will further spur this demand.

Therefore in order to safely accommodate all manned, VLOS and BLVOS UAS operations in the low-altitude uncontrolled airspace, a technology driven systematic approach is the need of the hour. Thus the concept of Unmanned Traffic Management system (UTM), as a solution, has become a reality. It is an amalgam of technological information aggregation and human enabled innovatory services of real time monitoring that will permit safe access and control of drones, guaranteeing maximum level of safety to all users. Thus the fundamental aim of the UTM system is to allow safe and efficient operations of UAS in low altitude uncontrolled airspace. However with passenger urban air mobility or UAM gaining prominence this operation will also come within the purview of the UTM.

Concept of UTM

The UTM initiative is primarily designed to mitigate the risk of collision among small unmanned aircraft systems (sUAS), a subset of RPAS, flying below 400 ft in uncontrolled airspace. The concept is also designed to segregate the participating sUAS from manned aircraft and other types of RPAs being controlled by air navigation service providers (ANSPs). In the civil air traffic parlance very low level operations (VLL) are up to 500ft AGL, with some exemptions while sUAS are drones with a payload of less than 25Kgs. UTM therefore is a concept that brings an automated Air Traffic Management like system to low and very low level airspace, which will be primarily utilised by unmanned aircrafts weighing less than 25 kg. The concept allows for drone registration, identification and tracking and a secure communications systems enabling a geo-fencing like systems that limits the drone operation within the uncontrolled air space thereby enabling visual monitoring to avoid collusion.

Broadly speaking the UTM function is distributed between a country's aviation authorities for registration, identification while the UTM service provide or UAS service suppliers (USSs) will be responsible for tracking and retaining the drone within the approved geo

fence through a secure communication system. The UTM provides the requisite information architecture, data-exchange protocols, software functions, and performance requirements for managing these low-altitude sUAS operations without intervention by air traffic control (ATC) facilities using a cloud service infrastructure. In addition these enterprise services shall support the sharing of information that promotes cooperative separation and situational awareness and sharing of flight intent between operators. It will also enable an USS to generate a UAS volume reservation (UVR),a capability that provides authorized USSs the ability to issue notifications to UAS or drone operators regarding air or ground activities relevant to their safe operation and to share it with all the stakeholders (e.g., other USSs, Flight Information Management System (FIMS) and UAS operators).

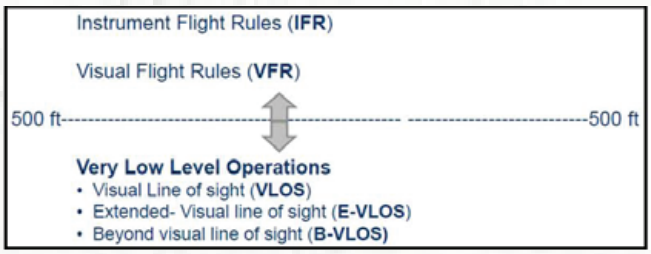
In so far as Urban Air Mobility (UAM) is concerned, as in the UTM, the airspace concepts, logistics, technologies and protocols for UAM would be the same but will remain distinct from air traffic control by ANSPs by separating the participating RPAs and autonomous/non-piloted aircraft "passenger drones" from manned air traffic. The typical UAM operator will fly missions between vertical takeoff and landing sites in a defined area e.g., airport shuttles and air taxi services, emergency response aircraft or package-delivery aircraft. Such missions would rely on precise navigation and timing through three-dimensional corridors of uncontrolled airspace. The benefits envisioned include high-speed transport, avoidance of motor vehicle traffic, and reduction of traffic congestion on streets, freeways and highways. Local UAM airspace are being designed to accommodate RPAs and autonomous/non-piloted aircraft for intra-city flights (less than 100 km/62 mi) and short-range inter-city flights (more than 100 km).

UTM Platform

Before we understand the operations of a UTM it will be in order to understand Civil UAS Classification into type of operation. The criteria set by the European RPAS Steering Group, on behalf of the European Commission, separates operations involving civil drones into two main categories:

a) Very low level (VLL): VLL operations with civil drones take place below the normal minimum altitude for manned aviation of 150 m.

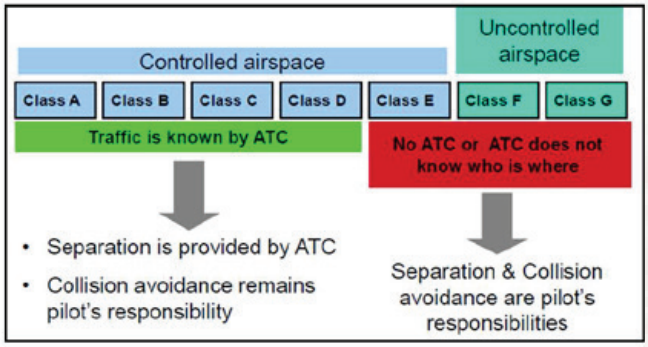
b) Visual Flight Rules (VFR) or Instrument Flight Rules (IFR) : These are operations that take place in airspaces above the normal minimum altitude meant for manned aviation.

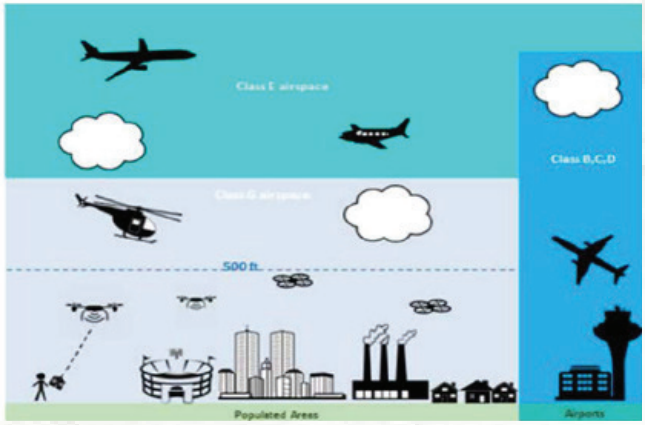


UAS VLL Operations (below 150 meters)

Essentially the airspace below 500ft/150m is used by UAS. This space is categorised as uncontrolled (e.g. Class G). Airspace above this level is controlled airspace eg. Controlled traffic region (CTR). All the small UAS VLL operations take place within this airspace and hence raise concerns of safety in the absence of a UTM. Further the new challenge is to develop a persistent communication, navigation and surveillance system (CNS) coverage that can detect, track and undertake separation management and collision avoidance between UAS, UAS and manned aircrafts, natural obstacles and buildings. For several applications UAS Operators need to fly at higher altitudes (e.g. 2000ft AGL). Thus Integration of UAS operations in VLL airspace as well as unmanned traffic management requires a completely new approach to ensure safe operations.

Classification of Levels





VLL UAS Regulatory Environment

Majority of authorized civil UAS operations are being performed under visual line of sight (VLOS). Most of the existing and emerging civil UAS applications can be served by UAS with maximum takeoff weight (MTOW) < 25 Kg . Small UAS are the main focus in many countries. Very few countries all around the world have some level of regulation in place for Beyond Visual Line of Sight (BVLOS) operations. However the increasing demand for BVLOS operations (mostly commercial) makes the definition of enablers (technical and regulatory) an absolute necessity.

BVLOS and improved airspace access

While the 25kg VLOS regulation is serving the market well to date, the establishment of BVLOS regulations or best practices is now required to be formulated to continue the growth story. Several civil UAS applications require the ability to operate at longer distances with heavier loads above 25 Kgs over specific areas or areas of interest for commercial operations. Many additional commercial UAS applications await BVLOS capability to become practically safe and viable. Some countries like US, Canada, Belgium and Poland have developed UTM systems for tracking and monitoring drones for BVLOS operations. But the commercial integration with ATM is in its nascent stage. In India there are several consortiums that have been approved to carry out BVLOS trials to generate empirical data on BVLOS operation so as to enable formulation of policy directions. This will enable the integration of the UTM systems under trial as well.

UTM Infrastructure

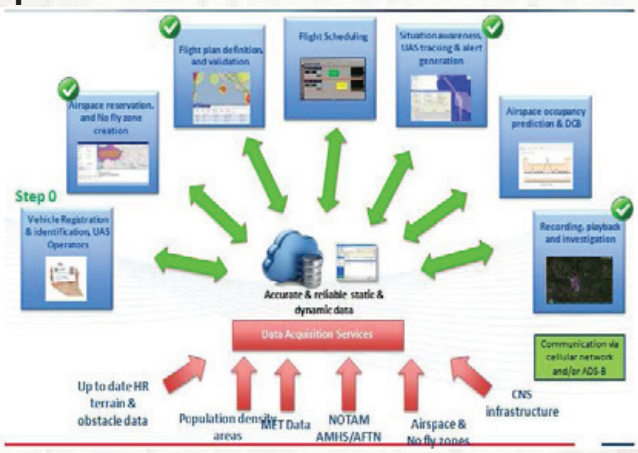
The development of a UTM infrastructure in any drone ecosystem is designed to manage critical safety aspects arising from incompatibility between manned and unmanned aircraft. The UAS Traffic Management is a concept for the management and tracking of small UAS traffic in low altitude airspace. The shape, content, role and components of the UTM are as under:

UTM Operations

At the heart of the UTM system is cloud based software that aggregates several inputs via a communication network service provider. These include up-to-date terrain and obstacle data, population density, MET data, NOTAM, Airspace and no fly zone and CNS infrastructure. The UTM software thereafter carries out a few drone related function in terms of verification, Identification and registration of UAS operators and the UAV. It creates an Air space reservation and no fly zone for other UAVs based on a flight plan definition and its validation. Having done that it also enables drone flight scheduling. Once the drone is airborne the UTM provides, situation awareness UAS tracking and alert generation. The UTM also provides air space occupation prediction and demand capacity balancer (DCB) along with recording and playback for investigations in the event of any untoward incident or accident.

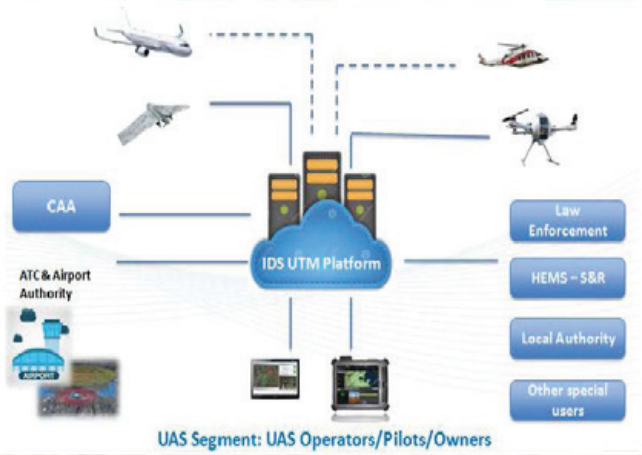
Data Acquisition and Integration required for UTM operations

Operations of UTM



Components of UTM

A standard UTN consists of two operating medium



namely:

a) UTM Hub: It is a virtual platform in charge of digitally centralizing and coordinating all data regarding drone operation in a given area. It enables communication and information exchange between different actors of the system. It also allows real-time bidirectional interconnection with the ATM. The UTM Hub is an essential tool that will allow authorities to monitor and manage drones activity

b) UTM Connect: It is multi-platform USP (Unmanned Service Provider) solution that enables the connection between a drone and the UTM system. It is the nexus to every service, the path to grant connectivity and freshly renewed information to all users to include drones, pilots, aviation nodes and regulatory authorities.

In the present context UTM is also being designed to offers a unique solution to detect and neutralize drones that invade unauthorized areas.

Through the joint integration of these three solutions a state of the art UTM create a global tool that permits the establishment of safe lower altitude airspace in a local, regional and national context. Further, all these solutions are compatible with the ATM system. Their integration increases every actor's situational awareness, guaranteeing a complete solution that will meet the highest safety expectation,

while enhancing security levels that guarantees the safety of airspace.

Conclusion

A UTM is essentially an air traffic management system (similar to airplanes) for drones, except that the process is automated in so far as data aggregation and delivery is concerned. However tracking and monitoring of these autonomous flights will be through human intervention to facilitate real-time location detection of a drone, and has anti-collision warning systems so that drones flying in the same airspace can mutually communicate to avoid collusion. This will be a panacea for future Drone Ecosystem.

Rendezvous with Mr. Nagendran, Founder, Throttle Aerospace Systems

Hello Mr. Nagendran, please introduce yourself to our readers. What inspired you to come up with Throttle Aerospace Systems?

Hi, I am Nagendran, founder & CEO of Throttle Aerospace Systems (TAS). We are based in Bangalore, India; a start-up focused on Drones. We are one of the leading drone manufacturers in India, we are offering products and solutions for both civil and defence business segments.

Basically I am an aeronautical engineer with 12+ years of professional experience in Aircraft Structure, Aircraft Interior, System Integration, UAV, Robotics, AI, Supply chain management, Lean Management & Business Development in Aerospace & Defence market. Worked in various levels in different aircraft program globally, various major aircraft programs like LCA, Boeing, Airbus, Bombardier C series and A/C interiors & Galleys Ground support equipment. The word" Throttle" means 'acceleration' and we've always wanted to grow fast and make our mark in the market. We are managing to do that.

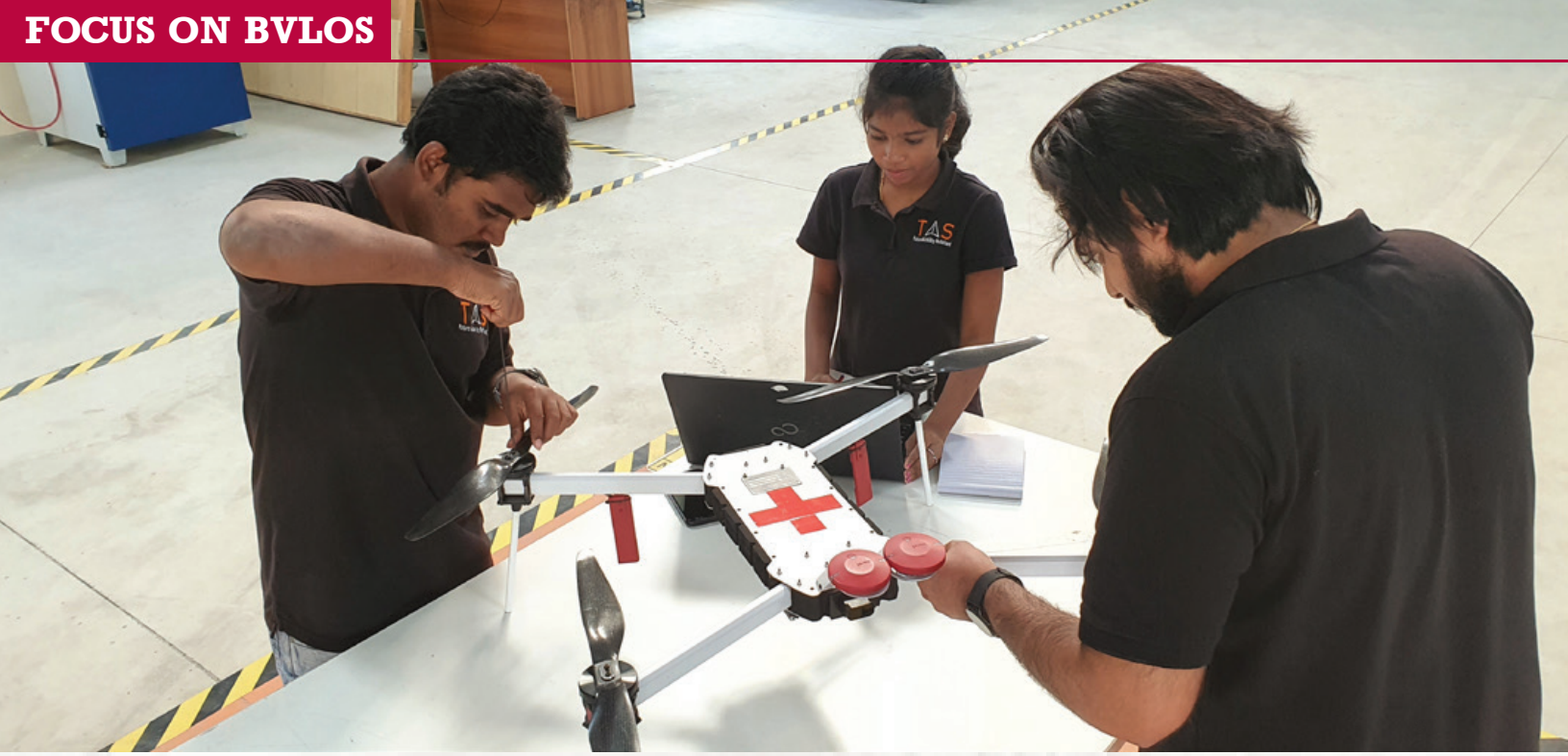
As CEO, I define the road map for technology and innovation in the field of Unmanned aerial technologies, composites and robotics. My international exposure, understanding of business model and practice of innovation and cutting-edge technology helps Throttle Aerospace Systems grow in innovation and technology in terms product development.

Brief us the journey of Throttle Aerospace since its inception to the esteemed organization it has become now in the space of UAVs. What are the challenges that you faced during its journey?

2016 is when officially TAS was started. Prior to that, 2 years we went in deep hardcore R&D in UAV/drones and understanding the market. Initially, the market was very nascent. It required lot of funding to enter into defence sector. But there was less competition in the civil sector, so we found it smart to enter in the civil sector. Over the time, we acquired clients in the defence sector as well. 2018 is when we started getting in orders and we became lucrative and in 2019 is when we became the first company to have a DGCA approved micro category drone. We also got approval from MoD to manufacture drone in 2019. Since then, the growth has been great. Some of our esteemed clients are Bharath Electronics Limited, Indian Air-force, Ministry of Mines, Honeywell, Wipro, Ericsson, private GIS entities and Institutions like IIT's.

What are the products and services that you are currently offering? What are the unique features of your products that your clients benefit from?

We mainly are a manufacturer and we do not provide any kind of drone services. Our products are highly scalable. The aircrafts are not just assembled; they are designed from scratch. So every calculation in terms of aviation standards are done in-house before a product is manufactured. Some of



our current products are LOOKOUT VTOL-LITE, LOOKOUT VTOL – X8, NIMBLE-i and +COPTER, also we are in verge of final R&D of hybrid UAV platform.

There`s a lot of buzz around NPNT compliances lately? Could you brief us what it is, its importance and how it works?

NPNT or 'No Permission – No Take-off" is a brilliant step taken by the DGCA to monitor the drones in India

- Drones are seen as next IT industry /leapfrog technologies but this comes with huge security threats, a reasonable size of drone can cause potential damages to commercial aircrafts and infrastructure.
- Hence the drone regulation is must for any country especially country like India, which is a developing economy and requires harmony between its economic, social and environmental needs in order to achieve sustainable development. A key enabler for building a sustainable economy is through technological intervention in market development. Currently, India is transitioning into a tech-enabled economy.
- And while it has emerged as one of the top importers of UAV's for military services, there is a consistent demand for commercial activities including construction, agriculture, mining, surveillance, infrastructure management and monitoring, amongst others.
- In order to prevent unauthorized flights, India introduced a Digital sky 'no permission, no take-off' (NPNT) module, which is very unique.
- It shows clear vision of our country regulators / ministries and we are really excited to be the first company who cleared the NPNT software / DGCA certifications.
- NPNT is a software program that enables every RPA to obtain valid permissions through digital sky platform before operating in India. It requires all the RPAS manufacturers to implement software & hardware changes that only allow flights authorized by DGCA to physically take-off.
- No RPAS will be allowed to fly without intimating the DGCA:
- Intended flight envelope
  - Time of flight
  - vPilot credentials

Many countries today are using NPNT one such example is Canada they have made their 'Safety Assured Flight Envelope' (SAFE).

Could you give us an insight into your partnership with SpiceXpress?

SpiceXpress is a subsidiary to SpiceJet and looking for first and last mile delivery using drones. Spicexpress already offers express delivery of blood, organs, medicines etc. Because the airports are in Digital sky's no-fly zone, the parcels will be moved to a hub by road and then delivered to the customers by using drones. We will provide drones and run it in testing phase, operations will be handed over to SpiceXpress once the regulatory approvals are received. We are looking at a payload capacity of 5kgs to 200kgs scalability in future on a staircase approach.

With DGCA looking into the

experimental data of BVLOS operations, when do you think would be the earliest commercial drone delivery happening? What are the possible factors that delayed such operations so far?

Ministry of Civil Aviation and DGCA, has taken a major step in promoting drones in India by allowing experimental flights Beyond-Visual-Line-Of-Sight(BVLOS). The trial flights should have started by mid-June. The pandemic played the major spoil-sport for the trials. Apart from the pandemic, getting security clearance, allocation of test areas consumed a lot of time. Commercial drone delivery requires 100 hours of testing under different scenarios. Once the DGCA are satisfied with experimental data, then the delivery can be started. On a personal level, I feel priority must be given first to medical delivery rather than any other. I would give it another year of time, before we see a full scale drone delivery system. Also DGCA is coming up with priority based approval system for different use cases.

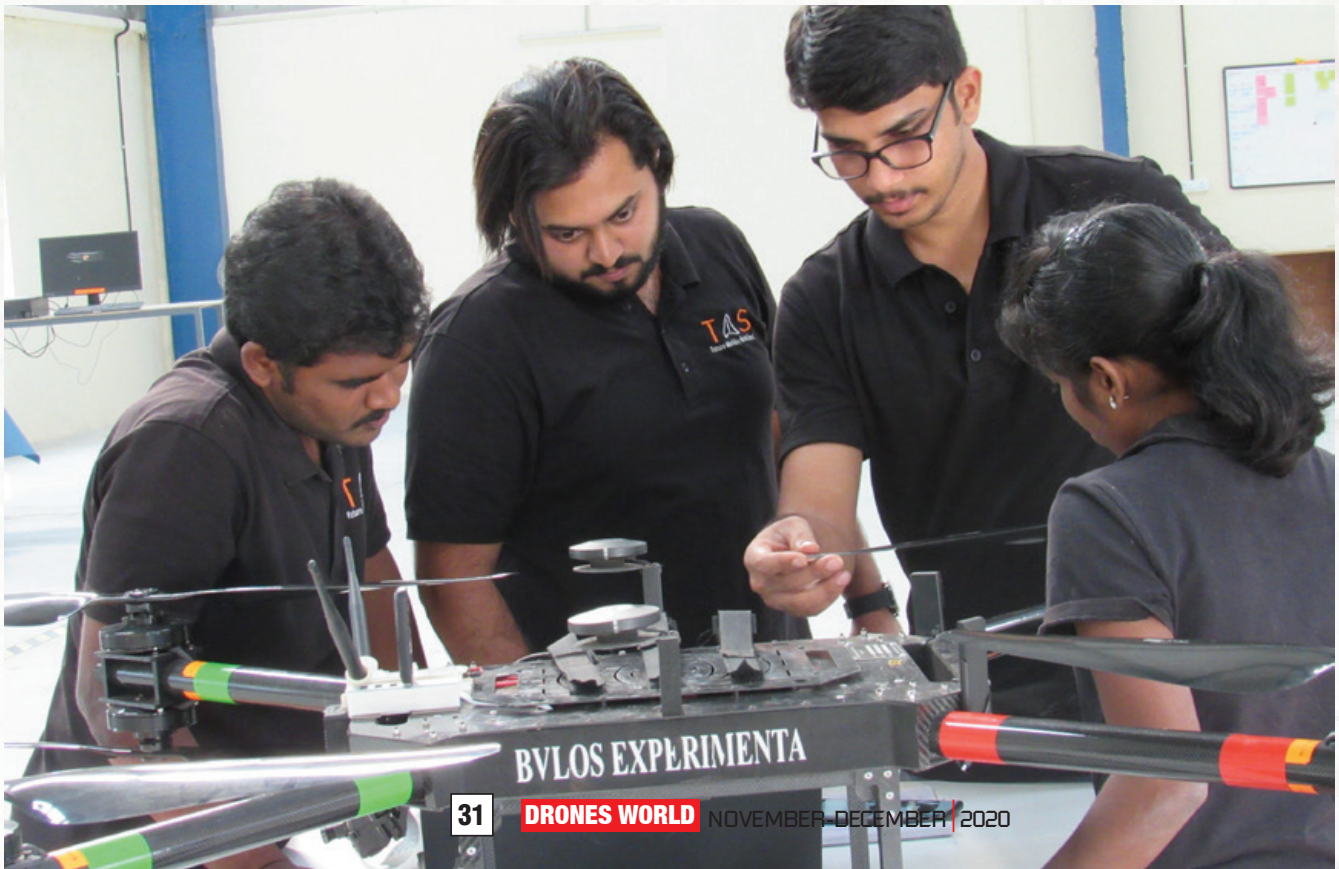
We would like to hear a few words from you regarding the future of mobility, the UAM.

UAM surely will be the next game changer in interms of how people travel or commute. Just as skyscrapers allowed cities to use limited land more efficiently, urban air transportation will use three-dimensional airspace to combat transportation congestion. These vehicles will enable quick and reliable commuting between suburbs and ultimately between cities. But the real challenge lies in developing the necessary eco-system with right policies, infrastructure, and standards. I think by consistent efforts, India can and will achieve this goal. Ultimate aim of TAS is Urban Air Mobility, which is as equal to general aviation standard from design to certification level. TAS team personnel expertise comes from various levels in different aircraft program globally, which will certainly help to achieve the milestone of Urban Air Mobility in shorter time and better way.

Before we conclude, do you have any suggestions for the young aspirants looking into the Drone industry for their career?

The growing use of drones will exponentially boost the demand for qualified professionals who can build, manage, service and operate them. This segment will be a booster shot for the job market in India. To meet the demand for professionals and experts in this area, it is imperative for the country to start investing in training and education. Moreover, further advancements and innovation in drone technologies will require large investments and focused efforts towards building the required infrastructure for skill upgrade and capacity building. It is predicted that this growth will be coupled with new employment opportunities

– particularly in manufacturing, operating and supporting drones. The growth in drone- related jobs will cut across sectors and industries.



Tracing the growth of UAV works. Drones World Editor-in-chief Kartikeya in conversation with Mr. Yago, the company founder.

Hello Mr. Yago. Why don`t you introduce yourself to our readers? How did your professional journey begin right after your college days? How did you get to the position where you are now?

Well, it has been long time since my college days. I am 47 now and I consider myself a very lucky man as I could always work exactly in all I loved to do. My first company was created from my degree final project in 1996, a tech company. In 2 years we were 30 people in the company and its equity reached 4 million €. In 2000 I was hired by Estrella Galicia (you can see this company now as one of the Formula 1 team McLaren's sponsors) working within the General Direction. In 2005 I then decided to change the professional sector creating an aviation company initially as Approved Training Organization and then in 2014 as an aerospace engineering company. I am also Air sportsman achieving 2 Gold medals in Spanish Championships (2017 & 2019) and 2 Silver medals in World Championships (2017 and 2019).

What sparked you to come up with the idea of UAV Works? What struggles did you face while upbringing UAV Works to the position it is now at?

The idea came out when I met my partner David Ortiz in 2014. When he told me his idea of designing and building VTOL airplane, I immediately understood the benefits in terms of efficiency. During my professional life I learnt that behind an idea, must be the right team and persons. Human factor and talent are the master keys of guaranteeing any success. Then I met Salva Puig and I decided we could make a great team for a challenging project. Today I

consider them Supermen. They, and now Lucas, are the best persons with the best attitude to face such a challenging project. Now I can say that because I saw them facing huge technical projects without hearing the fatal words “this is impossible to do it”. Hundreds of problems were solved in the last years during VALAQ development. Their huge talent and their right attitude to face every problem made it possible. When you see David learning programming from zero and in 4 months transforming complicated algorithms into C++ code to make work a critical flight control system in the autopilot. Salva learnt to design complex PCBs in 6 months and when he received his first manufactured PCB boards set and they passed all tests with no errors doing what it was expected they had to do, you just can say: “ok, this persons are not just like we all. Now I know this is going to work”.

The most important is that we have an aircraft that has more range and flying time that any other in its category. An aerospace engineer will understand why just by seeing it flying. But this is just a tool, you need to add another tools (payloads) to comply with specific functions, and this finally bring us a solution. This is exactly what we offer. Just solutions, this is the most important thing.

What are the various products that you are currently offering? Are you working on expanding your product portfolio?

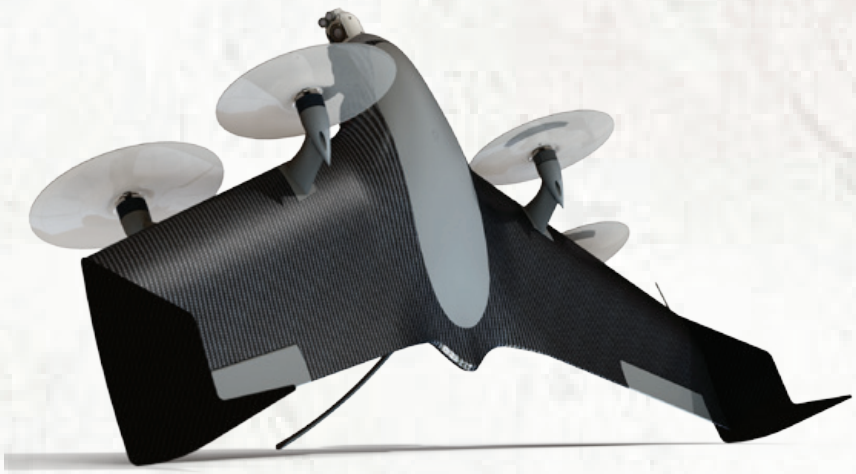
Right now we offer two products, VALAQ Patrol and VALAQ Mapper. VALAQ Patrol is a 4 kg UAV specifically designed for surveillance, security and defense. Its payload is the gimbal Colibri 2 from Nextvision Company. This is the lightest gimbal with the best performance in the world. A perfect tool for any police body or security agency. It is versatile; you can carry it in the

rear seat of any small car, and in 5 minutes is airborne. Its x40 zoom and its thermal camera will do the job. For following moving vehicles, objects or persons it offers autotracking feature. And the best of all, you’ll get more than 45 minutes at 70 km/h speed with a datalink video streaming of 15 km radius, or unlimited if you get 4G/LTE connection.

Another VALAQ Versions are being developed like VALAQ Courier for delivery purposes and VALAQ Inigne, which it will offer a firefighting solution for minimizing fire reignitions during a fire extinction. For this versions we are developing VALAQ 360 the big brother of 25 kg MTOW.

How did you come up with the idea of ‘Valaq’? Why a Tail sitter Hybrid VTOL? How do they differ from Multirotors and regular fixed wings in terms of flight characteristics and other parameters?

We start from the principle that a helicopter/multicopter needs too much of energy to fly. When it moves faster it consumes even more because of drag. A fixed wing is 3 to 5 times more efficient, but you don’t have the VTOL feature. An electronic engineer would design a fusion between both. Get a multicopter and attach a wing to the frame and you’ll get something like a bit efficient than just a multicopter. Even though it is something an aerospace engineer would never do. They would find another solution like tilting the engines 90º from up side to front side. This is a perfect solution but it has a critical disadvantage: it is complex to manufacture and it requires obliged maintenance to



avoid fatigue brokerages. David and Salva definitely went for simple and non complex mechanical parts in their preliminary design. This was completely challenging as all should be solved in the autopilot's programming. This is the core of VALAQ solution. This is the reason why the wing takes off vertically and then makes a transition from hover mode to plane mode. It does it just perfect. As smooth as perfect.

Seems like you have got competition from other tail-sitters. How does the offerings in your Valaq range compete against them? Is it possible for you to reveal the prices of the products for our readers?

Market will grow more and more every six months. We don't see others that got the same technology as a direct competitor, in terms of sales threat. Price is a way to compete but also post selling service is another key factor. We are focusing on giving the best customer service possible. Customers need a solution that must comply with their requirements. They want a product with quality, accuracy in the operation, robust, but also that someone solves their problem when needed. We'll be there to help at the front line. For example, if a customer needs an aircraft spare plastic part, we can provide in less than 8 hours any broken part providing with a spare part built in a local 3D SLS provider near customer location. And we can do that in any part of the globe independently our factory plant is located in.

No problem with prices. It depends of options but Mapper is at the price of 20.500€ and Patrol at 39.500€

Are you planning to expand UAV Works` portfolio into services as well? Would you like to set your foot on Indian soil anytime soon?

Yes. We are waiting for delivery market. It is still too immature and we need to wait for the regulations to be more stable in most countries, but as manufacturers we will become operators of delivery nets for medium and long ranges of courier shipping. As manufacturers we can provide best service at the lowest cost per hour flown. We have many ideas about it.

What is your prediction about advancements in the UAVs in the next 5-10 years? Do you think Hybrid VTOLs and Tail-sitters are going to take-over traditional fixed-wings and multirotors?

Well I don't have a crystal ball but I assume that every product has its mission and function. If you need an UAV for pure efficiency and very long range and you don't need VTOL feature, you better use a fixed wing for it. If you need a static drone for filming the best images and videos you will use a multicopter. VALAQ concept will give you what other can't give you. Each design and concept must be relocated for its specific use and it will take some time to reorder all in the market. This is part of the market development itself.

Where can we find you when you are not around your UAVs?

Hahahaha. Two possibilities, or flying with my own aircraft or spending time with my family.

Do you have any suggestions about who can enter into the UAV Industry? What are the future opportunities for them?

There's something that is called Applicability Index. There are thousands of unknown applications out there that are possible to be made with drones. This new applications will came out progressively as each sector, organisation or professional, find and realise by themselves that a specific task can be made with drones. We, manufacturers, receive those inputs from those collectives. I'll give you an example; last week we received a call from an international association of merchant vessels operators. They found that a huge problem would be easily solved by drones. Their need is simple: they often have to send and transport objects, money or documents, from vessels to other vessels or from vessels to earth and vice versa. They want to create their own drones net to give a solid solution. Would you ever imagine this would be interesting anyhow? I bet you don't. This is what I mean. The applicability index will be increased as traditional professionals by themselves find drones useful to cover their needs. Answering your question: anyone can enter into UAV industry, but it will take time for sure.

For Further details mail us at:

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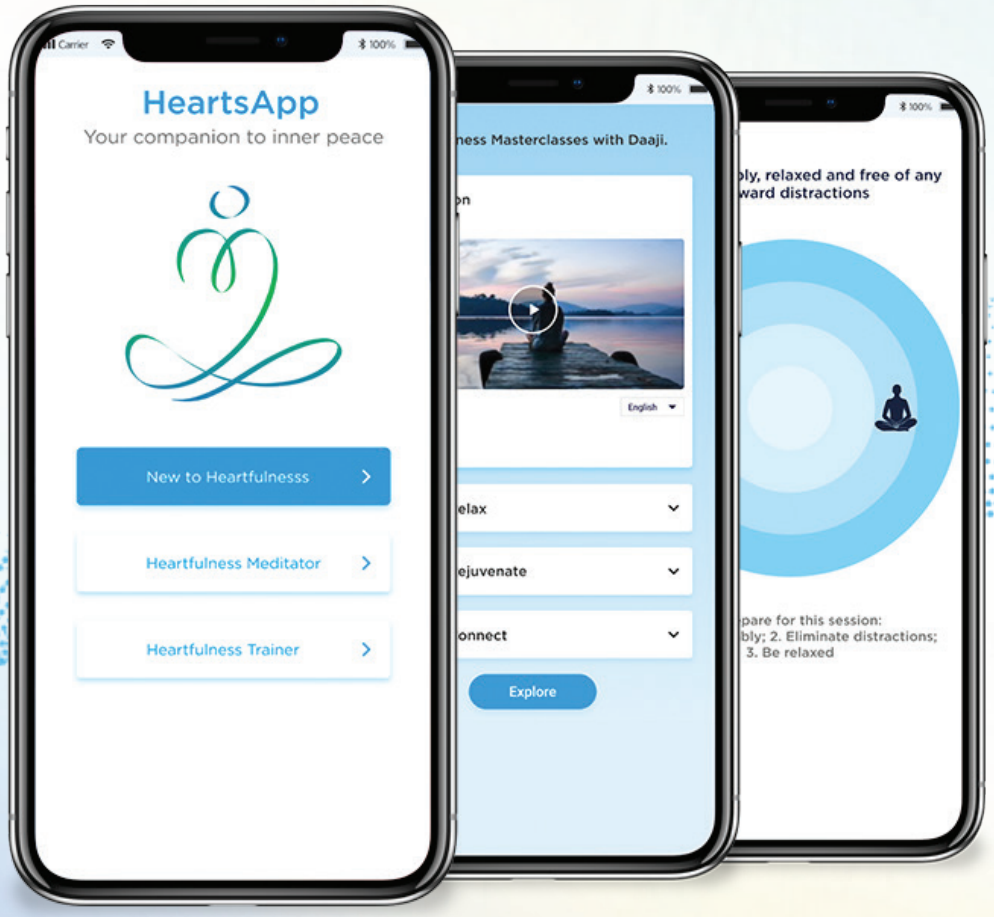

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