VISHAL DHARANKAR
CTO, PASSENGER DRONE
RESEARCH PRIVATE LIMITED

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INTERVIEW WITH

MR. C S SHARMA
JOINT DIRECTOR
PADD & HEAD PMU-UAS
QUALITY COUNCIL OF INDIA

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MR.ERIC TAIPALE
CTO & FOUNDER

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Precision Agriculture

Precision Agriculture is a new concept adopted throughout the world to increase production, reduce labor time, and ensure the effective management of fertilizers and irrigation processes. This training is organised by CSJMU Kanpur, ICAR–ATARI Kanpur & ICRISAT, Hyderabad in collaboration with many ICAR Universities & IIT's. The certificate structure of this program will allow you to gain knowledge and to develop experimental skill in precision agriculture.

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Evening Sessions

15 May-13 June 2023
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CONTENTS

DRONES WORLD

VOL 04 | ISSUE 4 | MAY 2023

Editor-in-Chief ◆ B. Kartikeya

DRONES WORLD is published by - B. Kartikeya

B. KARTIKEYA

Drones used to be considered a complete form of technology used primarily by the military and experts, but that is no longer the case. Commercial drones dominate the electronics industry and are increasingly employed for entertainment, news reporting, cinematography, emergency assistance, animal conservation, and emergency response. Starting may seem difficult if you want to use a drone to express yourself creatively. But in this updated version of Drones World, we simplify things more than ever. Nowadays, all you need to fly is a drone and this book; you no longer need to be a licensed pilot.

Looking through the UAM section, you'll see that Volocopter completes the setup for the manufacture of Electric Air Taxis. Raytheon Technologies have also unveiled the next-generation electro-optical intelligent sensing capabilities. Working in this booming field at this time is remarkable. The issue will cover the most recent news in the Drone News section. Additionally, you will learn in the section on defense that the US government is adding Alpha 900 helicopter drones to its UAV fleet.

After reading the parts on BVLOS, Acquisitions, and Products, look at the interview between Drones World special editor Dr. Pranay Kumar and Mr. C S Sharma, Joint Director, PADD & Head PMU-UAS, Quality Council of India. You will learn about CSUAS's main attributes and how inputs are gathered from various stakeholders for CSUAS. The discussion between Drones World editor Kartikeya and Mr. Eric Taipale, Chief Technology Officer & Founder, will also inform you about agriculture technology. Drones are now stealing the show with their applications, which are only limited by human creativity.

Both the publishing industry and the drone industry have seen a significant transformation. Although the world of drone electronics is constantly expanding, Drones World's commitment to being your source for news, analysis, and insight won't change. Through our reputable print publication or our expanding range of online goods, we will continue to be your go-to source for drone news and information.

Alpha Unmanned Systems join forces for manufacturing and support in South East Asia

Alpha Unmanned Systems (AUS) an unmanned helicopter (UAV) manufacturer based in Madrid, is pleased to announce that it will increase its manufacturing and support capabilities in SE Asia through a partnership with Indonesian firm PT Indadi Venyro.

Adi Haryono CEO of PT Indadi Venyro states, "We are pleased to offer Alpha products throughout Indonesia and to neighbouring countries. Alpha's helicopter platforms have enormous growth potential in the region and we are pleased to support and build Alpha products locally."

Eric Freeman, CEO of Alpha Unmanned Systems, adds that licensed manufacturing of Alpha products and local maintenance and support will help clients in Indonesia and throughout SE Asia. "We are delighted to work with an important regional partner. In April 2023, PT Indadi Venyro from Indonesia invested in AUS as a minority equity partner and will manufacture, distribute and support Alpha under license throughout Indonesia and SE Asia."

Alpha's A800 and A900 platforms are highly evolved and professional unmanned flight systems designed for both civilian and military/security use, with a high level of aeronautical engineering and sophistication.

Founded in 2014 with Spanish capital and headquartered in Madrid, AUS has made direct international sales to both institutional organizations (governments and the Armed Forces) and private entities, with highly demanding and recurring clients in Spain, Israel, USA, Greece, Indonesia, Georgia, Turkey, European Union, etc. With a highly qualified professional team, and with a clear commitment to its niche market, Alpha is in the "top three" of its sector of activity worldwide.

Its newest product, the Alpha 900, is a helicopter designed and manufactured primarily for missions in the marine environment. With a powerful combustion engine that gives it great autonomy and payload capacity (up to 4 hours and can carry payloads of up to 4 kg), the A900 can take off and land autonomously on and from moving vessels with limited space (small deck). In addition, it is built "STANAG Compliant", so that all critical systems are redundant. All this makes it a perfect technology for navies, coast guard and/or intelligence operations, surveillance, target approach and/or reconnaissance at sea.

The American Made CAP50 Drone Takes Flight

Carlson Software has released the American made Carlson Aerial Platform (CAP50). The CAP50 UAS can be used in surveying, construction, engineering, mining, quarry and mapping applications and offers up to 6lbs of payload capacity. It features multiple payload options for photogrammetry, LiDAR, and bathymetry.

The CAP50 has a 22-minute flight time with a 5lbs payload and has been tested against 50mph winds with maximum payload. The onboard omnidirectional collision avoidance system is LiDAR range finder-based and works in both day and night conditions.

"We wanted to offer a US-made drone to anyone in search of a US-made option," says Derek Roche, Carlson Product Manager and Sales Director. "With regulations against foreign drones flying in government airspace, the CAP50 is more than capable and stands out from other options on the market in terms of capability, quality, and durability."

The quadcopter features a carbon fiber frame and has 465KV motors rotating 18.5" carbon fiber propellers powered by a rechargeable 22.8V battery. Onboard is a RTK GNSS that utilizes a LiDAR range finder for altitude accuracy and vertical stability. The CAP50 can be programmed and controlled via an included flight controller with a touch screen.

Carlson software packages and bundles are available to suit the workflow, application, and the capture method of all CAP50 payload options. This includes Carlson PhotoCapture for photogrammetry as well as Carlson Point Cloud Basic and Advanced for LiDAR and Bathymetric data.

For more information on the CAP50, its compatible payload options, and partnered software solutions offered by Carlson, visit carlsonsw.com.

Sony Electronics Launches New SDK Version Taking Remote Shooting and Camera Integration to the Next Level

Sony Electronics announces the launch of a new version (Version 1.08) of the Camera Remote Software Development Kit (SDK) that enables remote operation and setting changes of Sony cameras. Version 1.08 widens the range of potential applications with new features, as well as expanding the compatible models. Version 1.08 means the SDK can be used with the ZV-E1 full-frame interchangeable lens camera.

"With each SDK release, we are integrating learnings from customers and expanding the functionality and magnitude of applications and capabilities," says Yang Cheng, Vice President, Imaging Solutions, Sony Electronics Inc. "The updated SDK allows our cameras to be used in more industrial and B2B applications, ranging from photogrammetry or medical companies, to inspection, and e-Commerce. We are excited for professional clients to have the ability to explore new functionalities."

Key new features include:

Improved processing speed: In repetitive shooting scenarios, the processing speed for setting, shooting, and transferring files is reduced by approximately 20%i, improving workflow efficiency. This will be perfect for e-Commerce applications, where users need to take 360 degree continuous pictures of an object or model for web publishing, with quick turnaround times. Capturing more frames in a shorter time also means that battery life is optimized, which is particularly important for drone applications such as mapping or surveying.

Added support for shutter trigger by electrical signal and remote power on/offii. In photogrammetry, photobooths or even road traffic management, an electrical signal improves the accuracy for triggering image capture, opposed to a software-based trigger.

New remote settings support: Version 1.08 supports remote menu settings for video, including picture profile settings and timecode (TC)/user bit (UB) settingsiii. This will create an enhanced workflow for video making and widen possibilities for existing photo-based applications.

"Overheating warning" status notification: This function allows the camera to notify remote users of any significant increase in temperatureiv. In outdoor applications such as desert roads or systems where the camera is embedded in a wider computer infrastructure with high heat due to processing, users will be able to monitor the cameras more precisely.

With this SDK release, software developers can design bespoke applications tailored to business requirements, integrating Sony's equipment for size-critical drone and speed camera systems, as well as other medical, education, government, and e-commerce applications. This SDK will continue to be available free of charge. The Camera Remote SDK can be used to control several cameras in the Sony camera range including Cinema Line cameras, with the full list of compatible cameras available here.

Aeronautics will supply the Greek Ministry of Defense with dozens of advanced Orbiter 3 tactical unmanned aerial vehicle systems as part of the Spike missile deal
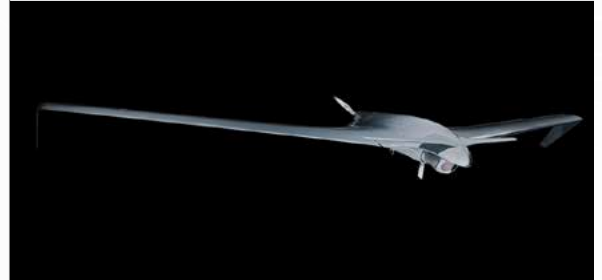
Aeronautics Ltd. – a world leader in designing, developing and manufacturing Unmanned Aerial Systems (UAS) for global defense and HLS markets – announces a contract to supply dozens of its Orbiter 3 systems to the Greek Ministry of Defense. The agreement is part of the large contract between the Israeli and Greek Ministry of Defense, worth approximately 370 million euros, for the procurement of Rafael's Spike missiles.

As part of the contract, Rafael will provide an advanced solution enabling significant operational advantage to the modern battlefield; While the Orbiter 3 systems detect, recognize and identify (DRI) the target, the Spike missiles, launched from the air, sea, or land can rapidly close the sensor-to-shooter loop, using the "Fire Weaver" C4I system. The rapid Sensor to Shooter process implementing advanced technologies, enables mission success.

The Orbiter 3 is a small tactical unmanned aerial system and considered to be one of the leading systems in its class worldwide providing superior performance for both defense and HLS applications. Highlights of the Orbiter 3 operational performance includes advanced ISTAR capabilities, runway-independent, long endurance, the capability of carrying various types of payloads, advanced image processing, a small logistical footprint, navigation including in a GPS-denied environment and the ability to withstand harsh weather conditions.

Dan Slasky, CEO of Aeronautics Group: "We are proud to be a part of this significant cooperation with Rafael in the G2G agreement with the Greek MOD. This collaboration demonstrates the technological synergy, and the close business integration between the two companies. We also thank the Israeli Ministry of Defense, which has invested significant efforts to facilitate the agreement, and to the Greek Ministry of Defense for expressing its confidence in the Aeronautics' solution."

Volocopter inaugurates electric air taxi production facility in Germany

A new Volocopter hangar was unveiled which will host the final assembly line for the company's electric air taxis and will be used to conduct development flight tests and quality checks. Volocopter, the leading innovator in urban air mobility, has announced the opening of its production facilities in Bruchsal, Germany. The milestone was marked with the unveiling of a new hangar, which will host the final assembly line for the company's electric air taxis. The facility will also be used to conduct development flight tests and quality checks. From this location, the first EASA-certified electric air taxis will be manufactured and deployed worldwide, with commercial services set to begin in 2024.

Dirk Hoke, CEO, Volocopter said, "Right here is where the aircraft that will change how humanity moves about cities will take off and make its way across the world. Electric air taxis and Volocopter, in particular, are technologies made in Germany that will make the world a more sustainable place."

The opening of Volocopter's production facilities is a significant step in the company's efforts to transform urban transportation. The facilities have the capacity to produce over 50 VoloCity aircraft each year and have received regulatory approval from the European Union Aviation Safety Agency (EASA) for compliance with production organization standards.

Andreas Fehring, Chief Supply Chain Officer and Program Manager of VoloCity, Volocopter said, "The VoloCity has completed the critical design review – and that's the aircraft we're ready to produce, with enough leeway for further learnings derived from flight testing. It's no easy task to set up a production facility for an entirely new type of aircraft, but my team has done a phenomenal job."

Volocopter's electric air taxis offer a holistic approach to urban air mobility. The VoloCity, VoloRegion, and VoloDrone aircraft are designed to work together seamlessly, creating a unique ecosystem. The company's commitment to sustainability and innovation has earned it the distinction of being the first and only electric vertical takeoff and landing (eVTOL) company to receive Design Organisation Approval from the EASA.

Volker Wissing, Federal Minister of Digital and Transport, Germany said, "Germany is already a world leader in the development of air taxis, thanks in part to Volocopter's great pioneering spirit. I would like to support and build on this leading role by creating a framework that enables innovation and progress. We are working with key industry players on a strategy for air taxi operations here in Germany, in which all technical and legal issues are addressed without delay. We are doing this so that the first drones carrying people and goods can take off very soon."

Autel Robotics Launches New Website, Focused on Industry-Leading B2B Solutions
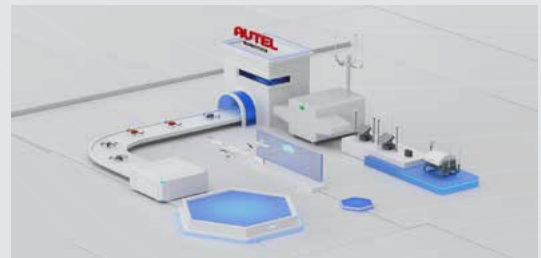
A utel Robotics, the leading global designer and manufacturer of high-quality drones and UAVs, is excited to announce the launch of the company's redesigned website. The completely-updated website focuses on industry-specific solutions and case studies to help customers better understand the benefits of Autel's highly-regarded drones and UAVs.

Autel Robotics recognizes a renewed need to address customer pain points and deliver solutions that provide clear and measurable business value. With this in mind, the new website shows a new focus – over eight key applications for drones and UAVs, including: Anti-Smuggling, Border Watch, Scalable Security and Premises Management, Transmission Line Inspection, Transmission Poles and Tower Inspection, Substation Inspection, Oil Rig and Refinery Inspection, Spatial Planning, and Engineering, Surveying, and Construction.

The revitalized website provides a look into the top industries being reimagined with UAV technology, highlighting both the key opportunities for displacement and the unique value an Autel-based solution provides. The business value of Autel's solutions are explained, followed by which Autel products are best suited for the job. The sections are designed to be informative, concise, and action-oriented.

Autel Robotics will be updating the case studies section of the website with new stories from across various industries, in an effort to show modern-day solutions in action. This will include real cases from police, fire, utilities, and government organizations that have utilized Autel products to solve problems and improve efficiency.

Autel wishes to provide customers with easier access to the information they need to make informed decisions about the best products for their needs. By presenting solutions in the context of common industry-specific challenges and issues, the company can better demonstrate the value of its drones and UAVs on the new website.

See Autel Robotics' new website at: https://www. autelrobotics.com

Cloud Ground Control Empowers Emergency Response and Disaster Relief with 5G Drone Fleet Control

Cloud Ground Control, developed by Advanced Navigation, has announced the launch of its cellular micro-modem CGConnect. Using 4G/5G networks, CGConnect links any uncrewed vehicle to Cloud Ground Control's cloud-based drone fleet management platform, enabling live-streaming, command and control from a web browser.

Cloud Ground Control is a SaaS platform that supports multi-user and multi-vehicle operations, making it ideal for robotic enterprises with a myriad of robotic fleets for emergency, security, construction, asset inspection, agriculture and environmental purposes.

Fast track into the cloud with CGConnect : "Enterprises who rely on drones and robotics for business operation often own a diverse range of uncrewed vehicles that may not be compatible with one another. CGConnect is designed to solve this pain point by linking them to the Cloud Ground Control platform, regardless of manufacturer or model, turning them into a holistic, connected fleet," said Michal Weiss, Head of Product at Cloud Ground Control.

Plug and play connectivity : Using CGConnect, remote users gain instant access to Cloud Ground Control's rich features, including real-time telemetry, cloud storage, video and payload data, all from a web browser simultaneously. Weighing only 55 grams with similar sizing to a credit card, CGConnect is easily integrated into any product design, offering the following benefits:

Open platform – The flexible and customizable open platform operates on the MAVLink standard. This multiplies potential product applications and enables diverse autonomous vehicles and payloads to operate as a coordinated fleet.

Robotic agnostic – Works flexibly with open-sourced libraries and is agnostic to the type of technology and vehicle enterprises may wish to use.

White labeled -Available as a white label product, allowing users to rebrand the user interface in seconds to complement business branding and coding requirements.

High-grade security – Utilizes military-grade encryption and authentication to safeguard data and IP from vulnerabilities and security breaches, helping users meet compliance obligations.

Simple and accessible – Revolutionizes multi-drone operation by making it simple, cost effective and accessible to users of every skill grade.

AI modeling – The platform runs AI algorithms in the cloud, relaying real-time camera feed data to the end user to support versatile missions, such as object detection, tracking and thermal imaging.

Edge AI – CGConnect supports edge AI to perform intensive object identification and classification directly on the vehicle for dynamic missions.

Unlock new markets : Integrating CGConnect into a vehicle's design expands the product's functionality and applications while saving development time. This allows manufacturers to fine-tune the product's competitive advantage, expanding the robot's potential and ultimately unlocking access to new markets.

Teledyne FLIR adds Development Kits for Hadron 640R Dual Camera Module Integration for Qualcomm and NVIDIA Embedded Systems

Teledyne FLIR released development kits for quick integration of the performance-leading FLIR Hadron 640R thermal and visible dual camera module. These hardware and reference software drivers are compatible with development boards supporting the NVIDIA Jetson Nano, the Qualcomm RB5, and the Qualcomm Snapdragon 865. The power of cutting-edge embedded systems can now be quickly unleashed by integrators opening a new world of possibilities and time and cost savings.

The Hadron 640R features a compact 640x512 resolution radiometric Boson® thermal camera module providing the ability to see through total darkness, smoke, most fog, and glare, capturing the temperature of every pixel in the scene. The Boson is paired with a 64MP visible electro-optical (EO) camera for high-definition visible imagery. The new development kits enable integrators to start imaging and controlling the cameras within just hours. This helps significantly reduce development time and costs further making it the ideal dual sensor payload for integration into unmanned aircraft systems (UAS), unmanned ground vehicles (UGV), robotic platforms, and AI-ready applications where efficient battery run-time and battery life are mission-critical.

"The powerful Hadron 640R development kits provide integrators industry-leading thermal and visible camera operation using both Linux and Android application development," said Michael Walters, vice president, product management, Teledyne FLIR. "Combined with the size, weight, and power optimized Hadron 640R and the Teledyne FLIR technical services team to support integration, these development kits further maximize efficiency for developers at every stage."

Details for Integrators

With low, steady-state power consumption at 1.8W and an IP-54 rating, the Hadron 640R offers extended battery operation time in a compact, lightweight 56-gram camera module. The plug-and-play development solution allows for same-day operation and comes packaged with interface boards, cabling hardware, and reference software drivers.

SkyDrop uses Kongsberg Geospatial IRIS Terminal technology to obtain New Zealand CAA approvals for suburban drone delivery

Kongsberg Geospatial, developer of the IRIS Terminal, and SkyDrop, a turnkey solutions provider of hardware, software, and patents for autonomous drone delivery, announced that the Kongsberg Geospatial IRIS Ground Control Station application has been implemented by SkyDrop in New Zealand to receive necessary CAA approvals in order to conduct suburban drone delivery operations. The CAA granted the approval after conducting a thorough review of SkyDrop's technology and operating procedures.

SkyDrop is now the first company approved for live store-to-door drone delivery in New Zealand beginning in the town of Huntly (Waikato, NZ). SkyDrop has now received three key approvals to conduct drone delivery: including certain beyond visual line of sight operations (enabling their drones to operate at their full radius for last-mile delivery), drone delivery over persons and property, and deployment of the first revenue-generating last-mile drone delivery hub with customers in New Zealand. The SkyDrop approvals utilized the detailed risk assessment methodology, known as SORA (Specific Operations Risk Assessment), as used in Europe, Canada, and other markets and offer a transferable approach to operator applications in other markets.

The Kongsberg Geospatial IRIS Ground Control Station technology is vehicle autopilot agnostic and enables multiple drones and sensor feeds to be monitored and controlled simultaneously by a single remote operator and provides real-time calculation of aircraft separation to enable BVLOS operations. Built on Kongsberg Geospatial's industry-leading TerraLens SDK, IRIS Terminal provides advanced real-time

2D and 3D visualization of all airborne track and weather data, as well as cues, alerts, and warnings to enable a single operator to monitor a complex airspace environment.

"We're very pleased to be working with Kongsberg Geospatial, the industry leader in precision real-time software for air traffic control. This approval is a ground-breaking milestone for SkyDrop, and the drone delivery industry as a whole" said Matthew Sweeny, SkyDrop's Founder, and CEO. "SkyDrop is set to launch regular drone deliveries to the

nearly 10,000 people and businesses in Huntly, New Zealand. Tell us: What will you deliver? And if you want to be the next business or town with drone delivery, reach out to us at SkyDrop!"

"We are excited to be collaborating with SkyDrop, an industry leader in last-mile delivery by drone," said Jordan Freed, President of Kongsberg Geospatial. "We have worked closely with their team to customize and implement our technology and their success is a testament to their world-leading capabilities."

Skyports Drone Services to launch drone delivery flights for Royal Mail

Skyports Drone Services, the global leader in drone logistics, surveys and monitoring, has announced the launch of the Orkney I-Port operation, a fully electric drone logistics project established in partnership with Royal Mail, Orkney Islands Council Harbour Authority and Logan air. The project is set to revolutionise connectivity, access and safety throughout the rural island region.

Benefitting from Skyports Drone Services' extensive experience in the operation of highly automated cargo drones, the project will deliver two new capabilities: daily inter-port delivery of Royal Mail items and the demonstration of shore-to-ship deliveries. The I-Port project is significant as it represents the first UK drone delivery project which can be conducted on a permanent basis under existing regulatory frameworks, a milestone made possible due to the unique landscape of Orkney.

Orkney's island geography and harsh weather impact the ability to provide an uninterrupted delivery service. Postal deliveries arrive from mainland Scotland to Kirkwall Airport via the Loganair RMA Orkney Flyer, where they are delivered to residents on Orkney's main island, Mainland, or transported to one of the 19 other inhabited islands via ferry or small passenger plane. Pauses in the ferry schedule are common during poor weather due the challenges of docking safely.

Skyports Drone Services will establish a daily inter-island mail distribution service, initially operating between three locations across Orkney for three months, with the intent to extend. Post will be delivered by ground transportation from Kirkwall to a Stromness hub and transported by drone to Royal Mail sites on Graemsay and the North of Hoy, from where postal workers will carry out their usual island delivery routes. The new service, which is set to launch in Q2 2023, will provide considerable benefits including time, cost and emission savings and improved connectivity for island residents.

The project's shore-to-ship flight operations will demonstrate the benefit of a seamless link between Orkney Islands Council Harbour Authority and vessels in its port. Skyports Drone Services will provide logistics for several use cases, including delivery of documentation and provisions and the transportation of bunker samples. Alongside the demonstration, Skyports Drone Services will conduct a feasibility study in partnership with Loganair to explore the future of heavy payload operations in Orkney. The I-Port project is funded by the Department for Transport's Freight Innovation Fund and executed by the Connected Places Catapult. The fund focuses on accelerating the adoption of commercial solutions to address challenges in the UK's freight sector and make it more efficient and cleaner. Skyports Drone Services is one of nine winners of the Freight Innovation Fund Accelerator.

Alex Brown, Director at Skyports Drone Services, said: "Rural and maritime logistics are contingent on access, weather and personnel; if one of these factors is compromised, so too is the ability to provide a safe and reliable service. Orkney is just one example of a hard-to-reach location that will benefit significantly from regular recurring drone operations. We're looking forward to showcasing how our flights can improve existing services on the island, improve connectivity for residents and support the work of Orkney's postal staff."

Chris Paxton, Head of Drone Trials at Royal Mail, said: "We are proud to be working with Skyports to deliver to some of the more remote communities that we serve in the UK. Using a fully electric drone on a permanent basis supports Royal Mail's continued drive to reduce emissions associated with our operations, whilst connecting the island communities we deliver to."

David Dawson, Orkney Councillor and Chair of the Council's Development and Infrastructure Committee, said: "Orkney has a strong tradition of playing a central role in the introduction of new ways of doing things, advanced technologies and innovation. The proposals within this project offer some interesting opportunities for our island communities – and I'm sure they'll be watching with interest as things develop. The possibility of drone deliveries from shore to ship in particular, could add an extra dimension to the services provided by our Marine Services team, vital as we look to position ourselves as innovators within the marine and harbour operations sphere."

Nicola Yates OBE, CEO at Connected Places Catapult, said: "The freight sector has an enormous opportunity to support jobs and growth across the UK which is why today we are pleased to welcome the nine SMEs to the first round of the Freight Innovation Fund Accelerator. "Working with innovators and industry partners through our accelerator programme allows us to develop a pipeline of technology and new ideas that promise to help tackle the freight sector's emerging needs, ensuring that resilience, efficiency and carbon reduction are core to the sector's future."

Volocopter Completes Production Setup for Electric Air Taxis

Volocopter, the pioneer of urban air mobility (UAM), announced the opening of its production facilities in Bruchsal. The company marked this milestone with the opening of a new hangar that will host the company's final assembly line with an airfield to conduct development flight tests as well as quality checks. All company-owned production sites, which will manufacture the first EASA-certified electric air taxis, will ramp up into full operation in April. From this facility, electric air taxis made in Germany will be deployed across the world, offering commercial services starting next year.

Volocopter's production facilities have the capacity – and more importantly the regulatory approval – to assemble 50+ VoloCity aircraft each year. And this is the final step of the production setup that Volocopter has been expanding in Bruchsal over the past 18 months. Since 2021, the company holds an approval as production organization in compliance with EASA regulation. This certification covers the entire VoloCity production process. It includes the manufacturing of carbon fiber parts, all aspects of the electric propulsion unit, final assembly with decking of the propulsion system and fuselage, and extensive end-of-line flight tests.

The ribbon-cutting ceremony was held on 4 April 2023 at the hangar. The event also featured a crewed flight of the Volocopter 2X. Key guests included Dr. Volker Wissing, Federal Minister of Digital Affairs and Transport; Mr. Winfried Kretschmann, Minister of the State of Baden-Württemberg; Dr. Anna Christmann, Federal Government Coordinator for German Aerospace Policy; and upward of 70 business and political representatives.

Dirk Hoke — CEO of Volocopter "Right here is where the aircraft that will change how humanity moves about cities will take off and make its way across the world. This region is known for transforming mobility – the bicycle, the car, and soon Volocopter, too. Electric air taxis and Volocopter in particular is a technology made in Germany that will make the world a more sustainable place."

Andreas Fehring — Chief Supply Chain Officer of Volocopter and Program Manager VoloCity "The VoloCity has completed the critical design review – and that's the aircraft we're ready to produce, with enough leeway for further learnings derived from flight testing. It's no easy task to set up a production facility for an entirely new type of aircraft, but my team has done a phenomenal job."

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Boeing to Advance Aerospace Innovation through Korean Industry Partnerships
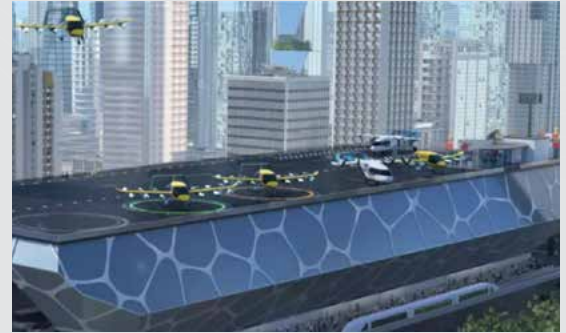
Boeing has signed a new partnering agreement with Korean industry to expand joint research and development activities and further develop critical aviation technologies. Boeing, the Korea Evaluation Institute of Industrial Technology (KEIT), and the Korea Institute for Advancement of Technology (KIAT), will collaborate on advanced production systems for commercial aircraft manufacturing, urban air mobility, aerospace semiconductors and cultivating industry talent in Korea.

Boeing Korea President Eric John, KEIT President Chun Yoon-jong and KIAT President Min Byung-joo signed the Memorandum of Understanding during Korean President Yoon Seok Yeol's visit to the United States.

Through this collaboration, the company and research institutions will seek opportunities to cooperate across the private and public sectors. These efforts are intended to enhance the competitiveness of Korea's aerospace industry and strengthen Boeing's future aerospace capabilities.

"We will continue to support the advancement of Korea's rapidly growing aerospace sector by leveraging Boeing's global aerospace expertise and Korea's cutting-edge technologies," said Eric John, Boeing Korea President. "We also expect this to benefit the country's aerospace supply chain."

KEIT will identify Korean companies with potential for participation, while KIAT will focus on defining areas for research, development and commercialization of advanced components for airplanes.

Boeing continues to increase its presence and pursue opportunities to partner and advance aerospace technologies with Korea, spending more than $4 billion with over 50 Korean suppliers over the past 15 years. In 2019, Boeing opened the Boeing Korea Engineering & Technology Center, where it has been conducting strategic research on future technologies, including autonomous flight, artificial intelligence, avionics, embedded software, Linux, mobility platform, smart cabin and smart factory.

Phoenix Air Unmanned Receives Nationwide BVLOS Waiver for Powerline Inspections

Phoenix Air Unmanned, LLC (PAU) received a broad area waiver from the Federal Aviation Administration authorizing utility powerline inspection flights beyond the visual line of sight (BVLOS) of the remote pilot in command. The authorization spans powerline infrastructure across the United States and builds upon thousands of miles of BVLOS transmission line inspection flight experience.

PAU has partnered with key industry providers, including Freefly Systems and Kongsberg Geospatial, for delivery of its complex nationwide BVLOS solution which requires multiple layers of safety and airspace deconfliction.

"PAU is thrilled to now offer scalable BVLOS UAS inspection services to utilities nationwide. Our past performance and commitment to aviation safety has led to this complex authorization. We have flown over 13,000 miles of inspections for Xcel Energy under FAA BVLOS waivers and can now scale the same services to all utilities across the United States", says PAU Managing Director, William Lovett.

PAU has been granted operations beyond visual line of sight of the remote pilot in command and visual observers, operations over people, and operations over moving vehicles. The waiver itself relies on a robust safety case to include electronic airspace surveillance, a clear and defined operating area, and performance criteria justifying the safety of the operation.

"Many issued BVLOS waivers require visual observers through the route of flight – adding cost and complexity. This authorization lists electronic airspace surveillance as an alternative risk mitigation. To build the operation we selected key partners with a track record of reliability and aviation experience. For electronic airspace surveillance PAU relies on IRIS Terminal, developed by Kongsberg Geospatial. IRIS Terminal provides our UAS operators with real-time BVLOS airspace visibility, by showing ownship tracks and cooperative and non-cooperative aircraft tracks all on the same pane of glass, located inside our mobile monitoring stations", says William Wheeler, Director of Operations for PAU. Phoenix Air Unmanned flight crews operate the Freefly Alta X over the centerline of the transmission line, flying from structure to structure and capturing multiple datasets including high-resolution inspection imagery. In June of 2021, a single PAU flight team captured 134.4 miles of transmission line inspection imagery in a single day. These inspections were flown under an identical BVLOS waiver, proving the scalability of BVLOS transmission line inspection flights with UAS.

> " The Freefly Systems Alta X is the aerial platform of choice, with adaptable payload mounting to include Phase One cameras or LiDAR. We have over 10,000 miles of transmission line inspection experience with the Alta X and the system's reliability goes a long way in proving the safety case to our regulators. "

Sagetech Avionics integrates DAA system with Elsight Halo drone to support BVLOS operations

Sagetech Avionics reports successful integration of its ACAS X-based detect and avoid (DAA) system with the Elsight Halo drone connectivity platform for aircraft seeking type certification/airworthiness with beyond visual line of sight (BVLOS) concept of operations.

Sagetech's Airborne Detect and Avoid solution requires a robust CNPC (Command Non-Payload Communication) link to reliably relay ACAS X alerting and guidance to the remote pilot, and to transmit the pilot's avoidance manoeuvre up to the aircraft. The complement of these systems to each other is dependent on the reliability of the communication link, making it a critical enabler for safer skies. The Elsight Halo product fulfills this need for secure connectivity and is used by many of Sagetech's current customers today. The Halo is the first AI-powered connectivity solution for uncrewed vehicles, guaranteeing constant uptime and connection between drones and ground control stations. This integration with Sagetech's ACAS X-based DAA system offers customers a low SWaP solution and simple integration, says the report.

The DAA/ACAS integration with the Halo tests included multiple flights to gather data and validate the technology needed to safeguard future BVLOS missions. Data gathered was shared with the FAA's TCAS Program Office for validating the models used to create the ACAS X collision avoidance algorithms. These successful tests were completed earlier this year on an aircraft seeking type certification.

BlueHalo bolsters leading position in Counter-UAS with Acquisition of Verus Technology Group

BlueHalo, a leading provider of critical capabilities and technologies across Space, Air, and Cyber domains announced it has acquired Verus Technology Group, Inc. Founded in 2014, Verus designs, develops, and integrates counter-Unmanned Aerial Systems ("c-UAS") products utilizing industry-leading radio frequency ("RF") and digital signal processing ("DSP") technologies. Verus's flagship product, SkyView, provides category-leading passive RF-based detection, identification, tracking and telemetry extraction of small unmanned aircraft systems ("sUAS"). Available in both fixed-site and mobile configurations, SkyView allows for a wide variety of use cases from military applications to defending critical commercial infrastructure. Verus's reputation for superior performance and ease-of-use has enabled the Company to deliver its critical solutions across a broad portfolio of demanding customers throughout the Department of Defense ("DoD") and Intelligence Community ("IC") including two Programs of Record with the United States Marine Corps («USMC») and Special Operations Command («SOCOM»), as well as civilian, commercial, and international markets.

The acquisition of Verus directly complements BlueHalo's AI/ML enabled, RF-based Titan c-UAS solution as well as the company's Locust directed energy c-UAS solution and ARGUS Perimeter Security solution. Verus's proprietary platform and software coupled with BlueHalo's existing technology will allow the combined enterprise to deliver a superior suite of products to support the warfighter in the ever-evolving next generation battlefield and protect critical infrastructure against adversarial threats.

"Verus has consistently demonstrated their ability to deliver critical, innovative c-UAS solutions to the most demanding customers across the DoD, IC and civilian markets. Combining SkyView and the team's proven ability to innovate at mission

TITAN C-UAS

speed alongside BlueHalo's Titan system positions BlueHalo as the #1 c-UAS provider in the market," said Jonathan Moneymaker, Chief Executive Officer of BlueHalo. "We are incredibly excited to bring Verus into BlueHalo and provide an integrated, superior set of solutions offering a protective ring around our customers as we seek to neutralize the ongoing c-UAS threat."

David Wodlinger, a Managing Partner at Arlington Capital Partners, said "Drone technology continues to proliferate, allowing bad actors to acquire greater capability at a lower cost. The U.S., and the world more broadly, are not yet adequately prepared for the threat that drones pose

to our critical infrastructure and national security. Within BlueHalo, we plan to invest an increasing amount of resources into bringing to market the best c-UAS solutions to address these emerging threats."

John Abbey, CEO and Founder of Verus, shared "We are incredibly excited to partner with BlueHalo as we continue to deliver innovative solutions to our customers. Joining BlueHalo will allow us to deliver an expanded set of capabilities and resources to both new and existing customers as we focus on achieving an even greater mission impact. We're thrilled to continue to push boundaries and deliver critical technology and capabilities to the warfighter with BlueHalo."

> "We have tracked Verus for many years as the Company has developed into the clear leader for passive RF detect solutions in the c-UAS market. With access to BlueHalo's extensive corporate infrastructure and resources, we believe the Company is well positioned to continue its impressive growth trajectory."
> Henry Albers, a Vice President at Arlington Capital Partners

Raytheon Technologies unveils next-generation electro-optical intelligent-sensing capability

Raytheon Technologies announced the launch of RAIVEN, a revolutionary electro-optical intelligent-sensing capability, which will enable pilots to have faster and more precise threat identification. RAIVEN can identify objects optically and spectrally simultaneously in real-time — a single electro-optical/infrared, or EO/IR, system has never been able to do this before.

RAIVEN can identify objects optically and spectrally simultaneously in real-time — a single electro-optical/infrared, or EO/IR, system has never been able to do this before. RAIVEN's 'intelligent-sensing' capability uses artificial intelligence, hyperspectral imaging, and light detection and ranging, or LiDAR, to enable operators to see up to five times farther and clearer than traditional optical imaging. This helps increase platform survivability and gives the warfighter decision advantage over peer threats.

Paired with AI, RAIVEN synthesizes reams of data into a detailed picture of the battlespace and the threats within it. The AI automatically detects and identifies threats, delivering a level of automation for the operator to choose what decisions need to be made – providing a critical capability while drastically reducing operator workload.

RAIVEN is a modular, open system that builds upon the successes of Raytheon Technologies' combat-proven Multi-Spectral Targeting System family of sensors.

RAIVEN provides more mission versatility and capability than ever before – all within the same size, weight and power specifications. The first version of RAIVEN, RT-1000, can support a wide array of missions, including the U.S. Army's Future Vertical Lift modernization effort, with the first flight test being conducted in 2024.

> "The future battlespace will consist of a myriad of threats from all directions evolving at an unprecedented pace," said Torrey Cady, vice president of Surveillance and Targeting Systems at Raytheon Intelligence & Space. "RAIVEN improves platform survivability and keeps the warfighter safe by providing accurate, persistent target observation coupled with accelerated information sharing. This combination enables a decision-making process that simultaneously reduces pilot workload while accelerating engagement decisions to prosecute targets much faster than adversaries."

DroneShield releases DroneGun Mk4

Dr oneShield is pleased to release a breakthrough new product, DroneGun Mk4, following extensive development in response to end-user feedback. The product is available for purchase from now to qualified end-users, where lawful.

Product summary is available at: https://www.droneshield.com/products/dronegun-mk4.

DroneGun Mk4 is a portable pistol-shape drone jammer, weighing 3.2kg. The Company believes this product is peerless globally, for its combination of size and effectiveness. DroneGun Mk4 is designed as an addition to the DroneGun product line, rather than replacing the highly successful long range DroneGun Tactical, and the ultra-lightweight DroneGun MK3, providing an optimal balance between size and capability. DroneGun Mk4 can also be used in combination with other DroneShield products, including the RfPatrol body-worn detection device and the DroneSentry stationary multi-sensor detection system.

Angus Bean, DroneShield Chief Technology Officer, commented: "DroneGun is an iconic DroneShield brand of products, from the original first-generation unit released in late 2016, to this latest offering. The product line has a deep heritage globally including U.S. DoD and all main western militaries, intelligence community globally and law enforcement customers. This product features break-through technologies such as advanced waveforms to offer unparalleled performance for its size and weight."

Cansel Partners with GeoCue to Offer TrueView Drone LiDAR and LP360 Processing Software

Cansel, a leading technology solutions provider for industries including engineering, surveying, construction, and utilities announced a partnership with GeoCue, a global provider of 3D LiDAR imaging sensors and geospatial software. (mdGroup is the parent company of GeoCue.)

Now as a distributor of GeoCue, Cansel will offer the full product line of TrueView LiDAR 3D imaging sensors and LP360 processing software throughout Canada. TrueView is an innovative drone LiDAR and photogrammetry solution integrated into lightweight payloads, allowing for fast, easily automated generation of true 3D colourized point clouds, oblique imagery, and orthophotos from a single drone flight. LP360 is an advanced desktop LIDAR software package that makes easy work of extracting information and generating deliverables in an intuitive GIS environment.

"Cansel is committed to providing our customers with the highest quality, leading-edge technology," said Martin Trudelle, Cansel's CEO and President. "That is why we've partnered with GeoCue, a company that shares our commitment to excellence. We know that our customers can trust that GeoCue's products and software meet our rigorous standards, and we're confident that this partnership will help us exceed their expectations."

According to Vincent Legrand, Vice President, Global Sales at GeoCue, his company builds partnerships with distributors who have high standards of excellence. "With Cansel's proven track record in technology solutions, we can both maintain our focus on innovation and growth while achieving superior results for our valued customers."

Mike Hogan, Cansel's 3D Reality Capture Segment Manager, leads the charge of helping clients capture, transform, and manage data. "The products and software available from GeoCue are a very good fit for our surveying customers," Hogan said. "Together with the support of our professional services team, we'll help our customers onboard these products, add them into their workflows, and employ these tools to grow their business."

Kris Kelly, the GeoCue regional sales manager for Canada, is excited about the opportunity to grow the TrueView and LP360 footprint throughout Canada and California. "Cansel's team of geospatial professionals has years of surveying and engineering experience," said Kelly. "They also have a deep understanding of the applications for GeoCue's LiDAR technology and software. This makes them an ideal partner to reach new customers and meet their geospatial needs."

ROCK Robotic Introduces R3 and R3PRO LiDAR, Advancing Survey-Grade Commercial Mapping Systems

LiDAR technology company ROCK Robotic announced its latest innovative LiDAR mapping system with the launch of the R3 and R3 PRO systems. The R3 product line introduces sophisticated hardware components into a lightweight, integrated 3D point cloud collection tool. The R3 launch is the latest effort for ROCK Robotic to offer a user-friendly, end-to-end LiDAR solution to land surveyors and commercial mapping professionals.

Inside the new ROCK R3, you'll find cutting-edge technology, including a geodetic-grade GNSS receiver and tactical-grade IMU. The R3 PRO comes equipped with a Hesai Pandar XT32 sensor, while the lower pricepoint R3 utilizes the Hesai Pandar XT16 sensor. The R3 includes a detachable 26MP camera for high-resolution RGB image capture. The sleekly designed R3 weighs only 1.26 kg (2.77 lb) compared to the previous ROCK 360 system's 1.70 kg (3.74 lb). In addition, the R3 offers optional advanced SLAM capabilities for mapping on the ground, as well as in areas with weak GNSS signals.

ROCK Robotic CEO Harrison Knoll is enthusiastic about offering the R3 to customers. «The ROCK R3 PRO is a major step forward for ROCK Robotic,» Knoll stated. «It offers better accuracy, better SLAM, a better camera, a lighter payload — basically a better product all around. Not only will our current customers love it, but we›re confident that the R3 will attract new customers who want a great hardware product along with our great software and support.»

The R3 LiDAR system will integrate into ROCK Robotic's comprehensive LiDAR approach. "We want surveyors and mapping professionals to have the simplest workflow while getting the best results and deliverables," Knoll expressed. "From the time you're out in the field flying your drone to when you send deliverables to your client, ROCK makes it as easy as possible to make it happen. With the recently released ROCK Desktop software, R3 system and ROCK Cloud post-processing software, we've got all the bases covered. ROCK is definitely stepping up as a major player in the LiDAR arena."

For more information on the ROCK R3 and R3 PRO, visit www.rockr3pro.com.

Marvel Geospatial presents anti-drone system to counter rogue drone threats

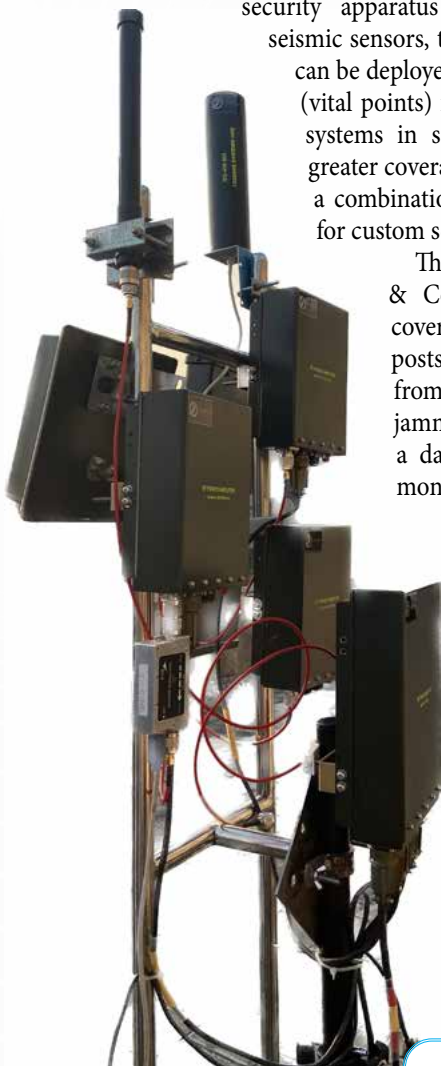## Raytheon Technologies Awarded $237M Counter-UAS Contract

Marvel Geospatial Solutions, the geospatial technology company, has added ADS, its anti-drone system for perimeter security against drones, to its product portfolio. ADS is a network-centric detection and jammer module system that features DDS based jammer signal generator. Made in India, the system has been developed to counter threats posed to military and civilian security through rouge/hostile drones.

"Reduced costs, ease of use, and favorable policies have facilitated widespread drone applications for societal benefits. However, the versatility of the drones has also increased potential threats against security and safety. The rise in incidents of hostile drone use has been a growing concern for security agencies. These threats can be mitigated through the deployment of counter-drone systems in sensitive areas to detect and defend / disable against the intruding drones," said Raghu Boyapally, Founder and Chief Executive Officer, Marvel Geospatial Solutions.

The system is easy to integrate with existing perimeter security apparatus like CCTVs, vibration sensors, seismic sensors, thermal sensors etc. A single system can be deployed with omni antenna for small areas (vital points) for protection and privacy, multiple systems in series with directional antenna for greater coverage for big facilities (vital areas); and a combination of directional and omni systems for custom scenarios for better defense in depth.

The system comes with Command & Control software that features live coverage and alerts at C2; integrates Sentry posts for alert processing, receiving alerts from drone detection unit and initiating jamming against GNSS drones. It features a dashboard for decision making, and monitoring health status of all nodes.

The system is ideal for security agencies, defense units, fire services, internal security / police, and other sensitive installations. It is designed to serve the anti-drone security requirements of defense and paramilitary establishments; international borders; critical infrastructures such as airports, oil & gas, nuclear facilities; public institutions, monuments; VVIP areas like President, Prime Minister residences; Parliament etc.; and research & Development establishments, amongst others.

Raytheon Technologies was awarded a $237 million U.S. Army contract for Ku-band Radio Frequency Sensors (KuRFS) and Coyote® effectors to detect and defeat unmanned aircraft's part of the U.S. Army's Low, slow, small-unmanned aircraft Integrated Defeat System, called LIDS, KuRFS provides advanced 360-degree threat detection, while Coyote low-cost effectors defeat drones.

The contract includes a combination of fixed-site and mobile systems as well as a quantity of effectors, designated to support the Army's U.S Central Command operations. As part of the U.S. Army's Low, slow, small-unmanned aircraft Integrated Defeat System, called LIDS, KuRFS provides advanced 360-degree threat detection, while Coyote low-cost effectors defeat drones.

"The KuRFS radar and Coyote effectors effectively detect and defeat unmanned aircraft systems, an increasingly evident and global threat," said Tom Laliberty president of Land Warfare & Air Defense at Raytheon Missiles & Defense. "LIDS is operationally deployed, providing a proven, reliable, and essential layer of defense against enemy drones."

KuRFS precision targeting radar and the scaled Ku720 mobile sensing radar deliver persistent detection, identification and tracking of airborne threats. The Coyote Block 2 defeats single drones and swarms varying in size and maneuverability, and at higher altitudes and longer ranges than similar class systems.

The U.S. Army's LIDS integrates KuRFS and the Coyote family of effectors with Northrop Grumman's Forward Area Air Defense Command and Control system, or FAADC2, and Syracuse Research Corporation's electronic warfare system. Together, these systems create a multi-mission fixed, relocatable, or mobile deployed system that provides a complete extended-range defense solution.

Joby Aviation to Deliver Aircraft to Edwards AFB as Part of DoD Contract Valued up to $131M

Joby Aviation, Inc. (NYSE:JOBY), a company developing electric vertical take-off and landing (eVTOL) aircraft, today announced the third extension of its Agility Prime contract with the United States Air Force. The $55 million contract extension brings the total potential value of Joby's current contract with the Air Force up to $131 million and underlines the U.S. government's continued commitment to leadership in this new sector. As part of the agreement, Joby will deliver and operate up to nine of its five-seat, low-noise, zero operating emissions aircraft, providing the Air Force and other federal agencies with first-hand experience of the performance of Joby's aircraft and its potential applications.

The first two aircraft are expected to be delivered to Edwards Air Force Base, California, by early 2024, and will be used to demonstrate a range of potential logistics use cases, including cargo and passenger transportation. In doing so, they are expected to become the first electric air taxis to be stationed at a U.S. military base.

Today's announcement comes days after four Air Force pilots, hosted by Joby at its manufacturing facility in Marina, California, became the first Air Force personnel to fly an eVTOL as sole pilot-in-command through the full flight envelope, including transition from vertical to wingborne flight. The flights, which were piloted remotely from the ground, came following completion of classroom-based and simulator training and are part of the Air Force's comprehensive approach to studying eVTOL aircraft and their potential future role.

"The Agility Prime program is a remarkably successful example of how public-private partnerships can deliver trailblazing technology at speed," said JoeBen Bevirt, Founder and CEO of Joby. "We're grateful for the support of the program and for the U.S. government's wider commitment to global leadership in this important new sector.

"As well as allowing us to explore the wide range of potential use cases across the U.S. government, our defense partners have also provided us with high-impact support as we prepare for commercial operations in 2025," he added.

"This next step of getting Air Force pilots trained and operating Joby aircraft at an Air Force installation is an incredibly important milestone for the program, providing key insights to actual operations and use case validation for Advanced Air Mobility aircraft," said Lt. Col. Tom Meagher, AFWERX Prime Lead. "Additionally, the Joby operations provide an outstanding opportunity for accelerated learning with the other Department of Defense services and government agencies, including NASA and the FAA."

Edwards Air Force Base is the second largest base in the Air Force and has been the site of hundreds of significant aviation "firsts." It's where Capt. Chuck Yeager and the Bell X-1 first broke the sound barrier on Oct. 14, 1947, the X-15 became the first winged aircraft to fly Mach 4, 5 and 6 and the space shuttle first landed on its initial return from earth's orbit.

"We're honored to continue the tradition of accelerating emerging aviation technology as we become the first base to exercise electric air taxis as they are intended to be used in commercial operations," said Lt. Col. Adam Brooks, Edwards Air Force Base, Calif., Emerging Technologies Combined Test Force commander. "This opportunity will allow us first-hand experience with Joby's revolutionary aircraft as we prepare to test this next generation of advanced air mobility," he added.

GA-ASI Flies MQ-20 Avenger Autonomously Using LEO SATCOM Datalink

General Atomics Aeronautical Systems (GA-ASI) conducted live, tactical, air combat maneuvers using Artificial Intelligence (AI) pilots to control a company-owned MQ-20 Avenger® Unmanned Aircraft System. Collaborative maneuvers between human and AI pilots were conducted using GA-ASI's Live, Virtual, Constructive (LVC) collaborative combat aircraft (CCA) ecosystem over a Low Earth Orbit (LEO) satellite communication (SATCOM) provider's IP-based Mission Beyond Line of Sight (BLOS) datalink. The LEO SATCOM connection was also used to rapidly retrain and redeploy AI pilots while the aircraft was airborne, demonstrating GA-ASI's ability to update AI pilots within minutes.

This marks the first deployment of a LEO SATCOM provider connections running on an operationally relevant unmanned combat aerial vehicle (UCAV) platform. The team used two L3Harris Technologies RASOR Multi-Functional Processors (MFPs) – one that housed the transceiver card and another that controlled the BLOS Active Electronically Scanned Array (AESA). The test aircraft was outfitted with a Ball Aerospace BLOS AESA system, capable of full duplex operation. The demonstration highlighted GA-ASI's commitment to operationalizing CCA by fusing innovative future warfare technologies, such as GA-ASI's AI pilots and LVC ecosystem, and L3Harris and Ball Aerospace BLOS datalink solutions.

"The flight demonstrated GA-ASI's unmatched ability to fly autonomy on real, tactically relevant, unmanned combat aerial vehicles," said GA-ASI Senior Director of Advanced Programs Michael Atwood. "It displayed effective BLOS Command and Control through the collaboration between three defense primes. This showcases our rapidly maturing CCA mission system suite and moves us one step closer to providing this revolutionary capability to the warfighter."

GA-ASI leveraged its end-to-end CCA ecosystem for the flight that fused third-party capabilities, human-on-the-loop control, and autonomy to enable effective human-machine teaming for 21st century conflicts. Operator commands were captured via hands on throttle-and-stick (HOTAS) controls and were sent via LEO SATCOM to AI pilots running Reinforcement Learning (RL) algorithms. AI pilots autonomously tracked and maneuvered around dynamically, and updated entities specified via HOTAS. Operators were provided updates from AI pilots on a cockpit heads-up display and could dynamically re-task via HOTAS as the mission evolved. In addition, data from agent performance was collected and sent to the ground where agents were retrained to improve performance, and then redeployed via LEO SATCOM in a matter of minutes.

This is another in an ongoing series of technology insertion and autonomous flights performed using internal research and development funding to prove out important concepts for UAS.

Leidos to Develop Autonomous Uncrewed Aerial Resupply System for USMC

Leidos a FORTUNE® 500 science and technology leader, was recently awarded a new prime contract to develop an uncrewed aircraft system (UAS) that can autonomously resupply forward-deployed ground forces. The firm-fixed-price, multiple-award contract has a period of performance of 18 months to build a single prototype for the Marine Corps.

"Leidos leads the industry in taking cutting-edge innovations and making them mission-ready today," said Tim Freeman, Leidos senior vice president and Airborne Solutions operations manager. "The ability to autonomously deliver hundreds of pounds of supplies over long ranges will be a game-changer for the warfighter. We look forward to demonstrating how the Leidos' SeaOnyx solution will help deliver a logistics advantage to the Marines and other branches of the military."

Under the contract, Leidos will develop, deliver and demonstrate an autonomous medium unmanned logistics system – air (MULS-A) prototype. The prototype will then be used to perform a logistics distribution mission at the tactical edge of the battlefield. The goal of the project is to demonstrate a prototype UAS that can carry a logistics payload between 300 and 600 pounds to a combat area with a radius of 25 to 100 nautical miles. The work will be performed at locations in Colorado, Ohio, Oregon, California, Nevada and Arizona.

Leidos teamed with Phenix Solutions to design the SeaOnyx prototype. Phenix is a non-traditional, veteran-owned small business defense contractor that develops UAS aircraft for a variety of missions.

Field Testing the Newest SKIRON-X Suas

Aurora Flight Sciences, a Boeing Company, recently released the second iteration of its SKIRON Expeditionary small UAS (SKIRON-X). The Group 2 unmanned aircraft system combines the convenience of an electric vertical take-off and landing (eVTOL) configuration with the longer endurance of a fixed-wing design. Over the winter, Aurora teams took SKIRON-X into the field to prove-out the results of product upgrades and to test vehicles newly produced in Aurora's Virginia facility.

The most recent round of product upgrades focused on optimizing battery usage through improvements in the propulsion system, software, and flight standards. While maintaining the same 49 lb. takeoff weight, the max flight endurance was extended to three hours.

"In addition to longer endurance, it handles better in gusty winds and the transitions from vertical to forward flight are smooth and fast. Also, the automatic low speed stall recovery behavior is more benign than any other aircraft I have seen," said Andrew Heafitz, chief engineer for the sUAS program. "SKIRON-X has a very good airframe architecture and seeing the tuning improvements we made in action this winter was really gratifying."

Flight endurance and other specifications are based on the vehicle equipped with Trillium's HD55 EO/IR camera system. However, SKIRON-X offers a highly flexible payload system, which can accept a variety of Trillium cameras or custom payloads. For example, Aurora often uses the Trillium HD25 with a 3D-printed nose cone ballasted to match the weight of the HD55. With SKIRON-X, payload swaps can be completed in the field in less than a minute.

The other features that make SKIRON-X field-friendly are its ability to take-off and land anywhere, its quick-and-easy assembly, and its innovative carrying case.

The SKIRON-X case converts into a convenient assembly stand, which keeps the vehicle secured while the wings and v-tail are easily snapped in place. A single tool attaches the wing assembly to the fuselage and securely closes compartments such as for the battery. This winter, Aurora conducted flight testing in both Massachusetts and Virginia, testing through cold and even snow.

"Our Massachusetts-based engineering teams love getting out in the field, even when it's cold. It gives us the opportunity to test our updates quickly and gain additional insight through hands-on experience," said Heafitz. "We were also able to partner directly with our manufacturing, flight operations, and field service teams based in Virginia."

SKIRON-X is in production at Aurora's headquarters in Manassas, Virginia. For more information, visit aurora.aero/skiron-x or stop by booth #2816 at AUVSI Xponential, May 9-11, 2023, in Denver, Colorado.

Safran on board the Eurodrone programme

Safran Landing Systems has signed a contract with Airbus Defence and Space to provide the wheels and brakes system work package for the Eurodrone, Europe's new MALE RPAS (Medium Altitude Long Endurance Remotely Piloted Aircraft System) reconnaissance drone.

Safran Landing Systems was selected to design, develop, qualify and produce the work package including wheels, brakes and hydro-mechanical equipment, and to supply the braking control module, to be developed by Safran Electronics & Defense, the company's partner on this programme.

The contract comprises 60 shipsets.

"We are proud to work on this programme with Airbus Defence and Space. It's an opportunity to demonstrate both our know-how and ability to develop the technologies that will equip this unprecedented new military system. We are looking forward to meeting a number of technical challenges on this programme, especially weight reduction, and delivering the best possible value proposition to our customer!" François Bastin, Safran Landing Systems CEO

Safran Electronics & Defense has also won a contract from Leonardo to develop and supply the high-performance EuroflirTM 610 electro-optical (optronic) system, for the Eurodrone. The Eurodrone programme is designed to outfit France, Germany, Spain and Italy with a highly autonomous medium-altitude reconnaissance drone, thus bolstering the European Union's operational and industrial sovereignty.

Production of the first prototype should start in 2024 with a first delivery planned by the end of the decade.

Inmarsat Government Unveils New LAISR Ultra-Lightweight User Terminal for Government Airborne, ISR Missions

Inmarsat Government, the leading provider of secure, global, mission-critical telecommunications to the U.S. Government announced the availability of its next-generation L-band Airborne Intelligence, Surveillance and Reconnaissance Ultra-Lightweight (LAISR ULW) user terminal.

The terminal, which consists of a core module and antenna, is the latest addition to the company's award-winning LAISR family of L-band terminals. ULW delivers access to high availability, high performance, full duplex, secure beyond line-of-sight (BLOS) communications via the Inmarsat global ELERA L-band network.

LAISR ULW provides customers with high data rate throughput to support BLOS communications, while further reducing the total terminal SWaP. Featuring an integrated antenna self-steering capability, ULW does not require external navigation data from the host platform and can operate in GPS denied environments.

LAISR ULW is enabled by Inmarsat Government's Black ICE Medium Software Defined Radio (SDR), which implements the powerful and highly efficient Digital Video Broadcasting Satellite Second Generation (DVB-S2X) waveform in a low-SWaP form factor. It also includes an advanced Radio Frequency Front End (RFFE), which provides robust filtering capabilities including automatic terrestrial interference protection. LAISR ULW also leverages Inmarsat Government's multiprotocol label switching (MPLS) terrestrial backbone to securely transport customer traffic from the platform to its destination.

Customers can select from multiple antenna options, enabling them to tailor the terminal to meet their unique requirements. Antenna options range from compact omni-directional patch antennas to fuselage mounted, high-gain, steered variants. The terminal can be implemented in a stand-alone configuration or retrofitted into an existing Inmarsat enabled aircraft.

Matt Wissler, Chief Technology Officer, Inmarsat Government, said "Beyond line-of-sight communications are a critical component of U.S. Government's AISR operations, and our customers need a secure, reliable and flexible solution to transmit information. With LAISR ULW, we provide our users with another compact and customer-focused innovation that supports their aero communications requirements for a globally portable, low-SWAP, flexible high-speed solution.

"We built these solutions tailored specifically to meet our government customers' mission-critical needs. The ULW terminal reflects upon their critical requirements for SATCOM-enabled BLOS connectivity and provides small UAS platforms (Group 2+) with a globally portable communications solution that provides high-rate return and maintains platform range to support ISR missions worldwide.".

MQ-9B SeaGuardian Featured in US Navy Group Sail Exercise

The U.S. Navy's Group Sail Exercise, held over a six-day period in Hawaiian military operating areas, featured one of the world's most advanced Unmanned Aircraft Systems (UAS) — the MQ-9B SeaGuardian® supplied by General Atomics Aeronautical Systems, Inc. (GA-ASI). SeaGuardian conducted Maritime Intelligence, Surveillance and Reconnaissance (MISR), Anti-Submarine Warfare (ASW), Long Range Fires, and simulated Battle Damage Assessment as part of Group Sail, which supported Carrier Strike Groups FIFTEEN and ONE.

During the exercise, which ran April 12-17, 2023, SeaGuardian integrated with U.S. Navy ships (carriers, cruisers, and destroyers) and aircraft (F-35C, F/A-18, EA-18G, E-2D, MH-60, and P-8) to support various naval missions that included Maritime Domain Awareness, Surface Warfare, Information Warfare, and numerous time-sensitive targeting objectives and simulated Battle Damage Assessments.

"We were thrilled that the U.S. Navy requested SeaGuardian be part of the Group Sail training event," said GA-ASI President David R. Alexander. "We know the many successes of SeaGuardian during the USN's RIMPAC 2022 exercise was a big reason the SeaGuardian was invited back to Hawaii to support Group Sail."

In addition to its contributions during Group Sail, the SeaGuardian self-deployed from GA-ASI's Desert Horizons flight operations facility in El Mirage, Calif., to Marine Corps Base Hawaii, covering over 2,500 nautical miles in a single flight and demonstrating SeaGuardian's unrivalled expeditionary attributes. The aircraft self-deployed back to El Mirage following the exercise.

Red Cat officially launches world leading sUAS for night-time operations, the Teal 2

Red Cat Holdings, Inc. a military technology company integrating robotic hardware and software to protect and support the warfighter officially launches its new military-grade sUAS, the Teal 2.

Attendees at the 2023 AAAA Army Aviation Mission Solutions Summit in Nashville, Tennessee, will see the Teal 2 on public display for the first time.

Previously available only to early-adopter customers, the Teal 2 is now available to order for military, government and commercial purposes. The U.S.-made system is manufactured at Red Cat's purpose-built factory in Salt Lake City, Utah.

"Most military operations take place at night, and the Teal 2 is exactly the sUAS that warfighters have been asking for," said Red Cat CEO Jeff Thompson. "Teal 2 is designed to 'Dominate the Night™' and arrives as the world's leading small unmanned aircraft system for nighttime operations. The system also offers the latest intelligence, surveillance and reconnaissance (ISR) technology, delivering time-critical information and enabling operators to make faster, smarter decisions."

The Teal 2 is the first sUAS to be equipped with Teledyne FLIR's new Hadron 640R sensor. This provides end users with the highest resolution thermal imaging in a small (Group 1) form factor, optimized for nighttime operations. Red Cat's other technology partners for the Teal 2 include Athena AI, Reveal Technology and Tomahawk Robotics.

The system's compact size and rugged design enable it to be rucksack portable and deployed in the most challenging environments. Multi-vehicle command and control allows for a 360-degree view of a target, or for ISR on multiple targets.

Early-adopter customers have included U.S. Customs and Border Protection, which ordered 54 units of the Teal 2. These systems are being used to provide supplemental airborne reconnaissance, surveillance and tracking capability, enhancing situational awareness for U.S. field commanders and agents.

Red Cat subsidiary Teal Drones is certified as "Blue UAS," which designates manufacturers authorized to provide equipment to the U.S. military. Teal is also one of only three drone manufacturers invited to participate in the U.S. Army's Short Range Reconnaissance Tranche 2 (SRR T2). The SRR T2 program seeks to deliver a portable sUAS that army platoons can use for surveillance and reconnaissance duties, as well as to improve situational awareness.

"The advanced technology and innovative design of the Teal 2 will help redefine the future of defense," said Thompson. "The AAAA summit this week is your first opportunity to see the system up close and in person."

AeroVironment Awarded $64.6 Million Contract by U.S. Army for Switchblade 300 Loitering Missile Systems

AeroVironment received additional funding of $64,565,126 on March 24 from the U.S. Army Tactical Aviation and Ground Munitions (TAGM) project office for the procurement of Switchblade® 300 loitering missile systems. This most recent firm-fixed-price contract increases the total funded amount of Switchblade systems under the original U.S. Army contract to $231,331,651. The contract will be managed by the U.S. Army Contracting Command, Redstone Arsenal, and the systems are scheduled to be delivered by July 2024.

AeroVironment's combat-proven Switchblade 300 loitering missile systems have been deployed by the U.S. Army for more than a decade and are currently providing real-time ISR and precision strike support on battlefields in Ukraine. Ideal for use against beyond-line-of-sight targets, Switchblade systems were approved by the U.S. government for use by Ukraine and additional nations after the start of the Russia-Ukraine war in 2022. This new U.S. Army contract includes foreign military sales of Switchblade 300 for the first time to France and another allied nation, expanding Switchblade's footprint internationally.

"Switchblade 300 continues to be a critical weapon in the armed forces of Ukraine's unmanned systems arsenal," said Brett Hush, AeroVironment's vice president and product line general manager for Tactical Missile Systems. "This new contract further demonstrates the global demand for production-ready, combat-proven Switchblade 300 missile systems. We're honored that Switchblade 300 continues to support the U.S. military and our allies."

The backpackable Switchblade 300 offers operators the flexibility to rapidly maneuver and employ the system on the ground. Real-time video, GPS coordinates, and wave-off capabilities provide the operator confidence in precisely attacking key targets. This contract award follows an August 2022 contract modification for additional funding by the U.S. Army for procurement of Switchblade 300 loitering missile systems.

U.S. Government Expands UAV Fleet with Alpha 900 Helicopter Drones

Rapid Expeditionary Concepts (REC), a veteran and minority-owned small business that specializes in providing end-to-end Command, Control, Communications, Computers, Cyber, Intelligence, Surveillance & Reconnaissance (C5ISR) solutions, has been awarded a prime contract from the U.S. Department of Defense (DoD) for the purchase of Alpha 900 unmanned helicopter systems manufactured by Alpha Unmanned Systems, SL in Madrid, Spain.

Under the terms of the contract, REC will be responsible for the integration of a specialized electro-optical sensor used in counter unmanned aerial system (CUAS) operations. The Prime and Alpha will provide deployment and training support utilizing the Alpha 900 in a joint operational evaluation to be conducted by the U.S Department of Defense over the next two years.

REC has a long track record of adapting commercial-off-the-shelf (COTS) technology for use by various end-customers in the defence, energy, and special operations communities. The company has a particular focus on integrating advanced payloads and sensors on board various manned and unmanned platforms intended for land, sea, and airborne use.

The Alpha 900 unmanned helicopter system from Alpha Unmanned Systems, SL is a small tactical helicopter that weighs only 55lbs and is known for its long autonomous flight time of up to 4 hours with up to 8.5lbs of payload capacity. Alpha's helicopter UAVs take off and land automatically on moving platforms, making them ideal for a variety of purposes, from maritime security to power line inspection, mapping, and precision agriculture.

Alpha's CEO, Eric Freeman, expressed his delight in supporting the U.S. government and fulfilling the demanding requirements for this project. He expressed his hope that Alpha's reliable products would lead to a long-lasting relationship with the U.S. government and help other Spanish companies with cutting-edge technologies enter the world's largest and most important technology marketplace.

REC's Program Director, Dr. Paul Kuttner, PhD, is confident in the team's ability to execute the program flawlessly. The team has been involved in the design, integration, and/or deployment of Group 1 – 5 unmanned aerial systems and subsystems of relevance for many years, and has the unique ability to leverage an operational mindset to develop training curricula and documentation that resonates with real-world end-users.

Overall, this prime contract award from the U.S. DoD is an exciting development in the UAS industry. The integration of Alpha 900 unmanned helicopter systems with a specialized electro-optical sensor will enhance CUAS operations and provide the U.S. government with cutting-edge technology to better protect against emerging threats.

Drones World
Special Editor
Dr. Pranay Kumar
in conversation with

Mr. C S Sharma
**Joint Director,
PADD & Head PMU-UAS,
Quality Council of India**

Q What is the role of QCI in Drone Quality Ecosystem?

A The Quality Council of India (QCI) has been set up as a non-profit autonomous society registered under Societies Registration Act XXI of 1860 to establish an accreditation structure in the country and to spread quality movement in India by undertaking a National Quality Campaign. QCI was established as an autonomous non-profit organization by the Government of India together with the Indian Industry represented by the three major industry associations: ASSOCHAM, CII and FICCI. The Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce

> **To make drone industry aware about CSUAS, number of sensitization programmes are conducted on frequent basis by QCI and queries related to technical clauses are resolved on a priority basis.**

and Industry is the nodal point for all matters connected to quality and QCI. The Council was established to create a mechanism for third-party assessment of products, services and processes. Recently, India has been rated among top 5 accrediting systems in the world, led by the Quality Council of India.

The release of Drone Rules 2021 has indeed made it possible to establish a global certification and accreditation framework for drones that would scale with appropriate safeguards, the commercial application of various drone technologies. The Directorate General of Civil Aviation (DGCA) had signed Memorandum of Understanding to establish a mechanism for

cooperation with the Quality Council of India (QCI), to develop and operate Certification Scheme for Unmanned Aircraft Systems (CSUAS) as per the applicable rules, regulation, and procedures from time to time. The process ensures that the UAS meets applicable regulatory requirements and secure international equivalence. Accordingly, on January 26, 2022, Certification Scheme for Unmanned Aircraft Systems was gazette notified by Ministry of Civil Aviation, Government of India.

Q **What is the current status of Certification Scheme for Unmanned Aircraft Systems?**

A Under the Certification Scheme for Unmanned Aircrafts Systems, 18 Type

Certificates have been issued to various UAS manufacturer as on date. This includes 11 for small category drones, 5 for medium category drones and 2 for micro category drones. More than 30 applications are under different stages of evaluation through Authorised Testing Entities (ATEs) or Certification Bodies (CBs).

To make drone industry aware about CSUAS, number of sensitization programmes are conducted on frequent basis by QCI and queries related to technical clauses are resolved on a priority basis. With reference to various clauses of CSUAS, specific clause-wise trainings are also conducted which include topics like Powerplant (battery), FE analysis and so on.

We are also collaborating with various States to sensitize them about CSUAS. Recently, QCI concluded 2-day capacity building-cum-sensitisation program for the state of Arunachal Pradesh where state government officials from different departments were present.

Q **What are the key features of CSUAS & how inputs are captured from various stakeholders for CSUAS?**

A CSUAS is an effort to establish an impartial, independent third-party conformity assessment framework to scale and support safe and efficient access to the Indian airspace by Unmanned Aircraft Systems. The scheme is

developed through a democratized and inclusive multi-stakeholder engagement process considering the views of the industry, accreditation body, standard development organisations, academia, regulators, and experts through an extensive deliberation process who are part of the multi-stakeholder steering committee. The CSUAS conformity assessment framework is based on ISO 17065 product certification requirement that would provide India's drone industry acceptance in the global markets.

Certification is a process which involves issuance of a written assurance (statement of conformity) by a certification body that the product meets the specific requirements as per the Scheme. This process culminates with issuance of a type certificate by DGCA (as mentioned in Drone Rules 2021) based on the statement of conformity issued by QCI approved Authorized Testing Entities (ATEs).

QCI has a well-defined system for Complaints and Appeals where the entire system has provisions for accepting complaints from any stakeholder against any component of the Scheme. There are provisions for entertaining appeals from the manufacturing units certified/desirous of certification under the Scheme, the Certification Bodies approved under the Scheme, and the laboratories utilized under the Scheme.

Q What is the way forward or future plan with reference to CSUAS?

A The scheme is presently limited to visual line of sight. QCI is working to develop Certification scheme for Beyond Visual Line of Sight operations (BVLoS) and is also supporting NITI Aayog for preparation of RFP for Drone as a Service.

QCI is working to strengthen the current scheme on the basis of learnings after issuance of various Type Certificates through detailed data analysis and identification of the implementation challenges in the certification process. Accordingly, various circulars and guidelines are published on QCI website, along with periodically updated FAQs. Anyone interested in CSUAS should visit to QCI website for more technical details.

New JACKAL drone completes first firing of a missile in significant unmanned air combat milestone

A new versatile drone system capable of multiple types of combat mission over land, sea and air has completed a highly successful first trial firing of a Thales Lightweight Multirole Missile (LMM) to bring the potential of unmanned air combat a step closer to reality.

The JACKAL drone capability has been designed and developed by experts from UK-based Flyby Technology, with Turkish partners FlyBVLOS Technology and Maxwell Innovations providing design engineering and prototyping expertise, to fill a recently discovered gap in modern combat operations. As a Vertical Take Off and Landing (VTOL) platform, JACKAL is designed to satisfy a number of roles, including Battlefield Air Interdiction, Close Air Support, engaging helicopters in flight and killing tanks, to denying the use of runways and roads.

The trial - sponsored by the Rapid Capabilities Office (RCO) of the Royal Air Force – involved teams from Flyby and the technology giant Thales which also manufactures the LMM. Within a demanding six-week window, they were able to build two operational JACKAL aircraft and successfully fire two LMMs in an impressive demonstration of agile teamwork.

As a plug-and-play system, new equipment and technologies can be incorporated into JACKAL between missions as well as during continued development. The company says this novel streamlined procurement process ensures that future aircraft are not obsolete before they go into service and will remain relevant for longer. It also gives a pathway to future regulatory compliance and airworthiness standards.

Flyby Technology CEO Jon Parker is a former RAF and Royal Navy fighter pilot and he and his team have brought many years of operational experience to bear in the design of the capability. The company says many nations cannot afford attack helicopters or access fast jets that are modern enough to survive today's battlefield. JACKAL can give them the same effect with little risk at a fraction of the price. Because the aircraft was born from the ideas of

Harrier pilots, the aircraft takes off and lands vertically, another advantage over traditional fighter jets as there is no need for vulnerable runways. It also means that JACKAL can operate from hidden locations such as woods and urban built-up areas. A unique selling point for JACKAL.

Following the invasion of Ukraine, Flyby Technology was asked to brief the RAF's Rapid Capabilities Office (RCO) on their new drone system. The Flyby team also contacted Thales in Belfast - where the LMM is designed and manufactured - to explore the possibility of firing it from JACKAL in a trial. The Thales team accepted the opportunity to work with Flyby to be the first to fire their LMM (also known as Martlet in the Royal Navy) from a drone in flight. Flyby Technology planned and built two operational aircraft from scratch and fired two LMMs in the demanding timescale of six weeks.

Firing a sophisticated missile is not an easy task under the best of conditions and then only with meticulous planning taking many months. JACKAL then being an unproven, experimental aircraft, just added to the complexity of the challenge says the company.

The Belfast team rose to the challenge magnificently and just six weeks after getting the call, the combined teams successfully fired two LMMs proving that JACKAL had arrived as a devastating combat capability able to fire modern battlefield weapons in flight.

Air Commodore Jez Holmes, Head of the RAF Rapid Capabilities Office, said "Given the impressively short time scale it took the team to deliver the initial trial, it's clear that Flyby could have an exciting future in this sector, and the partnering and support from Thales was outstanding in lowering the barriers to entry for innovative start-ups. I'm looking forward to seeing the ongoing developments in this area."

Philip McBride, Managing Director of Thales in Northern Ireland, said: "One of the unique selling points of LMM is its ability to be integrated onto multiple platforms, including armoured vehicles, helicopters, naval vessels or indeed, shoulder-launchers, each designed to address different threats. It has been a privilege to work with the Flyby team on this time-compressed and ground-breaking trial and has proved that both Thales and Flyby can produce impressive and agile results when focussed on a collective, shared objective."

> Jon Parker, Flyby Technology CEO, said: "War is about winning, and JACKAL is designed by war fighters for that ultimate aim. The days of having a Fighter Pilot in the cockpit are numbered and I realise I will not perhaps be loved for bringing about the end of my own kind. But the future of warfare is changing and JACKAL is part of that future as a true multi-role attack aircraft. We want to make JACKAL a flagship product, creating secure UK jobs and contributing to a new future for the British aerospace and defence industries."

Drones World Editor Kartikeya In conversation with

Mr.Eric Taipale, Chief Technology Officer & Founder

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

A I have been working with UAVs for about 20 years, starting in the aerospace and defense industry. I'm an engineer with a background in signal processing and control systems. Building aircraft without people in them is hard, and I've been lucky to work with some of the most skilled people in this area, but my work has usually had more to do with the sensors, algorithms, communications that come along for the ride.

In my career, I've been really fortunate to work on teams with access to very advanced sensors - underwater, on the ground, in the air, and above the air. I learned how to think about data measurements within a pretty rigorous framework, and I am grateful for that background. I was especially interested in how information from different sensors can be combined to produce insights that no single device can deliver. Those skill are important in our work in food and agriculture.

Q **Talking about the agriculture technologies, drones are stealing the show lately with their applications limited to our imagination. What is your opinion on their utilization?**

A Drones and robotics are a perfect fit for many tasks in agriculture. It's been said that drones work best on things associated with "3D" work - Dull, Dirty, or Dangerous. When a

machine can step in for a human in these cases, the person can focus on doing things that are safer and more rewarding. Most farmers are happy to have their tractors autosteer to place seeds or apply products with pinpoint precision – it's just much easier. Likewise, if we can deploy a small drone to assess crop performance or detect a disease or weeds in a field, it saves time and money versus a person time walking or driving, and we'll probably get better data and insights with less disruption to the field. Sentera does sensing, but it's worth noting that drones are being used to deliver chemicals and fertilizer to crops as well.

Drone technology is steadily declining in cost and the regulatory environment is progressing, so the number of applications where drones make economic sense will continue to grow. However, there's a limit. Drone data, like multispectral and hyperspectral data, thermal imagery, LIDAR data, and millimeter-scale RGB imagery can be combined with machine learning and deep learning to quickly produce a range of insights. But this won't replace the decision-making and expertise required of the human experts who use these tools. In our case, these experts are agronomists, scientists, and growers. The experts will get higher quality data more quickly and more cost-efficiently, but they're always going to be the ones making the important decisions.

Q **How good are the Agricultural Drones in terms of cost effectiveness, crop yield and conservation of resources?**

A Agricultural drone systems are a valuable tool from research trial to crop production. Traditionally, human labor is used to capture field-level data.

Because labor is expensive and scarce, it sometimes made sense to only sample a portion of a field. Drones really change the economics for many of these use cases.

In a lot of cases, this proceeds incrementally. The first usage of a drone might just mimic the old manual process. It will just be faster and cheaper. After a customer develops trust in the technology, they'll start to think about what becomes possible – should the data be gathered more often, should the whole field be analyzed instead of a few samples, or can data be aggregated across many sites to understand how a product is performing? These lead to tweaks to a current product or sometimes to entirely new products. It's fascinating to be a part of this process, because the community is eager to experiment and quick to adopt when a capability is proven out. Weed management is a great example. Traditionally, growers would spray their entire field with a type of herbicide called "non-residual" even though this type of product really doesn't do anything unless it contacts an actual weed. Using aerial imaging, we're able to detect where weeds exist, create a prescription for herbicide application in those distinct areas, and enable the grower to apply this product just to weeds, not to a bunch of crops or dirt - while reducing costs and resource use in the process.

Sustainability is an important topic within our world, specifically in agriculture, and drone technology can play a role here. The kinds of precision application scenarios like the one discussed above are emerging more and more. A really interesting observation we've had is that economic success and sustainability go hand-in-hand, and technology is a critical ingredient in both.

Q You visualize the advancements in the Agritech sector in the next decade? What would be the participation of Sentera?

A We'll continue to see machine learning and artificial intelligence deliver more precise, accurate solutions at scale – helping to accelerate product development and improving grower outcomes. We will continue to see precision Ag and remote sensing have an expanding role, especially as we continue to experience shifting dynamics given some key macro challenges like climate change and changing weather patterns. Machinery on the field will be more autonomous, and seed, chemistry, and fertility (like fertilizer) products will be targeted and applied with greater and greater precision. We focus on digital tools at Sentera, but the innovation going on in seed breeding and biological technologies is equally compelling.

Today, Sentera serves as the industry leader in delivering Ag analytics powered by machine learning. Our team continues to push the limits of this technology, advancing our data sets and delivering more value to our customers. This will continue to be our focus so we can help our industry – specifically agriscience leaders – positively impact the broader macro challenges that we face, from food productivity to sustainability to climate change. We are in the very early stages of this transformation.

Q What are the various products and services that Sentera has in offer currently? Could you elaborate its specifications, capabilities and the possible modifications?

A Sentera's solutions are designed to support the unique use cases in agronomy. Our sensors are designed to capture multispectral data so our customers can view vegetative indices, like NDVI and NDRE, to understand and monitor crop health throughout the season. We have a wide range of product, extending up to the most advanced and accurate equipment in market. For our research customers, our 6X – available as a multispectral and thermal option – provides science-grade imagery to offer more precision with 6 synchronized apertures. We most recently launched our ultra-high-resolution aerial sensor, the 65R, which is

designed to get RGB imagery that detects key changes in crop health and performance.

Combined with our DGR System, which provides geolocation accuracy, this is set to revolutionize how we are able to detect plant stress by providing insight earlier than what we were ever able to do before – all while making the data available much faster. Finally, our PHX fixed-wing drone leads the industry in collection efficiency. The data and access to it is important, but it's just data until it's made actionable. Sentera's data science products include a geospatial data platform, image-based deep learning engine, and agronomic machine learning to deliver the plant-level measurements and insights for our customers. And, of course, we use these tools ourselves to provide more analytics products than I can mention! Broadly, Sentera can take imagery, weather, soil, field activity, and other data and translate it into analytics that offer deeper insight into crop health and performance.

A few examples include tools that measure how well seeds emerge, predict the date and volume of harvest, assess biomass and vigor of plants, and scan for signs of stress, disease, drought or nutritional deficiency.

Q **What are your suggestions to youngster who wish to choose Agriculture Drone Industry?**

A The agricultural drone industry has a number of opportunities, from working at a company like Sentera that builds and sells drone systems and data science to an agriscience organization that hires pilots to fly fields and process data. For anyone with interest in the market, start exploring – find an internship, start flying a drone, reach out to a farmer to see if you can partner with them to start to collect data and understand what an ag drone can deliver. There are great business models around technology development, product deployment, and value-added services. The best

strategy is to get close to those that are the most interesting and ask a bunch of questions!

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

A The UAV industry has evolved immensely over the past decade; and we'll continue to see advancements that make drones more affordable, accessible and easier to use. We are already seeing that with mission planning and execution – easier-to-use handheld controls are eliminating usability as a barrier to entry. Drones themselves will become more nimble and efficient to increase flight times and contribute to safer missions overall. There are some industries where drones have found their foothold, and over the next decade, we will see broader adoption – much of which will be made possible based on the technological advancements that we'll see in these systems.

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Drones World Special Editor Dr. Pranay Kumar in conversation with

Vishal Dharankar – CTO, Passenger Drone Research Private Limited

Q **What was your key driving force to become an entrepreneur? How best can you describe the journey of PDRL since its humble beginnings to where it is now?**

A We are a DroneTech Startup company established in the year 2018. The driving force of becoming an entrepreneur was the booming Drone Ecosystem. When we decided to climb the ladder of Drone Industry, we believed to bring in a revolution of simplest technology that creates more time to live.

PDRL began with a strength of 6 people and today PDRL is a Team of 60+ professionals and experts and growing. PDRL has expanded its presence in Bangalore and soon in Delhi. A dedicated space for product development named "Propeller 1" is situated in Nashik, Maharashtra. The wholesome picture is well painted and bright.

We are ready for new advancements, developments and expansion in 360 degrees already.

Q **What are some of the challenges that the GIS & Drone industry faces? What are**

the key challenges PDRL faces in deploying smart technologies in the GIS and Drone sector? What would you say is the biggest problem for drone companies today?

A We love challenges, it works as the fuel to us. Indian Drone industry is evolving as per the new advancements, PDRL has ensured AeroMegh stands out and is preferred by old as well as new players in the industry. Fortunately, our passionate product development team is on the toes to implement new features to stay

ahead of the competitors. So, we don't just overcome challenges, we create a market demand that AeroMegh satiates perfectly. Many other sectors are getting into the usage of drones for multiple purpose. The main challenge of Drone Industry was, there was no such product/platform that worked as a "one stop solution". The users have to hop through various software and applications that makes their task time consuming, whereas many software is so complex that the user gets confused while using it.

Our main aim here was to develop and deliver a platform that helps the user right from planning missions, flying drone, capturing drone data, processing drone data and further analyzing the drone data with AI+ML. This works as a One-Stop Solution for the users and also maintains data security. The simplicity of the platform makes it easy for the user to get hang of it in its initial mission planning phase. The wholesome motive of the simplicity is to let the user focus on the tasks that matter the most, perform and get quicker insights, eventually resulting in creating more time.

Q **What are the recent innovations of PDRL in**

India? What is your biggest USP that differentiates the company from competitors? Mention some of the awards, achievements, recognitions, and clients' feedback that you feel are notable and valuable for the company?

A We have recently launched a software especially for agriculture spraying. AeroGCS GREEN is a mission planning and precision agriculture spraying software that is developed to improve lives. AeroGCS GREEN has multiple features and potential that save time and human efforts, optimize usage of resource, help to produce nutritious thus, resulting in improving lives.

The biggest USP is the simplicity of the platform and a one stop solution for all drone missions. Once a user signs up on AeroMegh platform, all required tasks can be performed on the SaaS itself with on-time interesting business insights.

PDRL has been featured twice in the insight success magazine as "The Most Prominent Drone Companies in India 2022 & 2023". PDRL's AeroGCS GREEN is featured in Time of India for its unique potential

AeroGCS appears on the first page

of google search organically with the keyword "gcs software"

PDRL has recently launched Certification Program to upskill the interested professional in the Drone Domain.

Can you brief your experience and challenges on GCS Software? How your application software is capable to mitigating those challenges?? What are the key USP of your products?? Briefly highlight on the services offer by PDRL to their end customer.

AeroGCS is India's first GCS software and PDRL takes pride in saying that. In today's market, there are multiple open-source software that can curb the need of mission planning and flying the drone. Whereas for enterprise, they need more than just a software to fly drones, that's the beauty of AeroGCS. AeroGCS makes mission planning, flying drone, capturing drone data easier also provides business insights and enhanced features like Team collaboration, etc. This makes AeroGCS a great choice for all and not to forget the simplicity of it that makes it remarkable.

Q **In India very few companies have Drone & lidar data processing stand alone or cloud software in India? What is your opinion on low-cost Drone or lidar**

data processing cloud software. Does PDRL have any Drone or lidar data processing software solutions? Any specialize Geo-spatial or drone or photogrammetry or lidar application software training course design and develop for new startup companies?

A PDRL has a well-defined software for processing data named "DroneNaksha". DroneNaksha DroneNaksha is designed with a thought of delivering one of its kind drone survey and mapping experience. DroneNaksha is a SaaS from AeroMegh platform for various photogrammetry solutions along with orthomosaic, DroneNaksha generates other data types like Digital Surface Model, Digital Elevation Model, Vegetation using various photogrammetry algorithms. Its simplified process makes DroneNaksha one of its kind platforms for processing Drone captured data.

Q **How good and accurate are the drones when compared against traditional methods of surveying/mapping? There has been a lot of competition lately in terms of surveying/mapping with the emergence of a lot of drone companies? How will you visualize the future of Drones in the coming 5-10 years? How do you advertise your business?**

A The kind of boom that Drone Technology is taking in various industries is amazing. Drones in survey and mapping are redefining solutions by reducing time and cost consumed, focusing on output by increasing productivity and providing seamless solutions. Traditional ways of carrying out challenging tasks like inspection, mapping, road surveys etc. have been made easier. Tasks like

inspecting infrastructure, such as bridges and cell towers is a perilous business. Engineers and dedicated personnel have traditionally been put in harm's way as part of the job, purely because there's no other way to reach a vantage point that's enough useful. Risks involving and time-consuming tasks are being heavily dropped with the use of drones in numerous sectors. Drones are being used for streaming events live, capturing videos and images for different purposes, life occasions and number of major events. Substantially, the world is witnessing an innovation revolution with drone's introduction in various aspects of economy. Drone deliveries are soon going to be one of the major mediums of logistics. It is expected to be taking boom by the year 2030.

Q **Finally, what is your perception about Indian GIS & Drone industry & what are the pain points to be answered to make india as real drone hub? Anything else you would like to comment on the GIS & drone sector potential and growth in the country?**

A The drone sector is called the sunshine sector and is witnessing fast growth. Drones have gone from niche to mainstream in the past few years and have become a critical developing technology in the deep-tech sector. With liberalized Drone rules, new advancements in technologies, government support, and a conducive ecosystem, the sector's future is promising. In India, the introduction of the new liberalised rules is helping release India's airspace for drone operations. The government is actively implementing various public initiatives to encourage the use of drones.
India has already decided to

emerge as a leader in drone technology. As a matter of fact, this decade has witnessed the widespread usage of Drones in every sphere. There's not a single industry that drone technology has left untouched. Powerline transmission, mining, railways, roadways, renewable resources, agriculture, disaster management, etc. – the Drones have established their prowess in every sector. According to the reports by Drone Federation India, there are at least 100 drone manufacturers, 200 drone service providers, and over 1 lakh drone pilots in India. And the drone industry is sure to generate around 5-7 lakh job opportunities for people all over the nation.

Q **How PDRL is working towards creating a sustainable future? How PDRL is able to manage successful outreach strategy?**

A PDRL works with the vision of delivering end-to-end solution for every industry. The development team does wonders when it comes to developing products. All necessary parameters are considered thorough, planned and executed in 360 degrees. Be it R&D, product development, marketing or outreach strategies.

Q **What advice would you give someone (young generation) who is considering a career in IT, GIS and Drone Industries?? What advice would you give to someone just starting to fly drones?**

A The game of drones has just begun and it is going to rise to greater heights. Make most of this time, upskill in the drone domain, learn the best technology stack and sharpen your skills to be known as the experts in the booming ecosystem.

Redwings and Jaunt Air Mobility Sign LOI for Purchase of Jaunt Journey EVTOL

Redwings S.A. De C.V has signed a nonbinding Letter of Intent with Jaunt Air Mobility LLC to purchase Jaunt Journey electric vertical takeoff and landing (eVTOL) aircraft and launch a strategic collaboration in Mexico. Jaunt plans to support Redwings in its launch of an air taxi service in urban markets beginning with Mexico City.

"The elevation of Mexico City at 7,349 feet is higher than Denver, Colorado, and presents challenges for many VTOL aircraft operating at this altitude," says Bernardo Moreno, President of Redwings. "The Journey's highly efficient vertical flight capability enables this aircraft to operate at altitude with no performance limitations."

"We are excited to work with an outstanding team at Redwings to bring urban air mobility to cities in Mexico," says Simon Briceno, Chief Commercial Officer for Jaunt. "Our Jaunt Journey's exceptional main rotor technology with low rotor disc loading and tip speeds will provide Redwings with high efficiencies in vertical flight at high altitudes."

For more than a decade, Redwings has operated a fleet of aircraft and helicopters throughout the Americas and Europe, and it seeks a safe, low-carbon footprint, high-speed air transportation system for passengers and cargo. Redwings intends to purchase ten Jaunt Journey aircraft with an option to purchase an additional ten units.

"After researching many eVTOL aircraft, the Jaunt Journey offers the safest aircraft with low operational costs and, of course, the performance needed," states Moreno. "We will collaborate on operations, passenger experience, infrastructure, and market education."

Jaunt Air Mobility, headquartered in Dallas, Texas, is developing and certifying the Jaunt Journey in Canada. These piloted aircraft will provide an affordable mode of transit for four passengers to commute in and around urban areas. In addition, the Jaunt Journey aircraft will be able to transport cargo with its unique reconfigurable design and be used for emergency services.

The Journey's patented Slowed-Rotor Compound technology offers a significant safety advantage allowing the aircraft to autorotate or glide to the ground in a controlled manner under a complete power loss. As an all-electric aircraft, the Journey will produce zero emissions and be extremely quiet. Committed to sustainable values and environmental practices, Jaunt will utilize clean manufacturing, minimizing energy and materials, and Jaunt anticipates that the aircraft will be over 90% recyclable at the end of its life-cycle.

"Jaunt now has customers throughout the Americas, Europe, and Asia. At the end of the day, we are highly confident in the Journey's operational capabilities and our path to certification," says Briceno.

Vertical Aerospace Reaches Significant Certification Milestones, Including DOA

Vertical Aerospace a global aerospace and technology company that is pioneering zero-emissions aviation announces further progress on its path to certification for the VX4, including securing the first ever Design Organisation Approval (DOA) issued to an eVTOL manufacturer by the UK Civil Aviation Authority.

Design Organisation Approval

UK and European aerospace companies cannot hold a Type Certificate without being granted a DOA. The DOA authorises Vertical to conduct design activities and issue design approvals within the DOA's scope of approval. As an approved Design Organisation, Vertical will have increasing authority and privileges as we progress through the design and certification programme of the VX4. This approval means the CAA is satisfied that Vertical has the capability to design a safe and reliable aircraft and aviation-related products to the highest standards. This

is expected to streamline the steps towards obtaining Type Certification.

The process for achieving DOA involved a rigorous assessment of Vertical's procedures, its quality management system, the competence of its technical workforce, and the necessary facilities and equipment to support the design activities to certify the VX4 aircraft.

Certification progress

earlier this month, the CAA announced its intention to adopt European Union Aviation Safety Agency's (EASA) Means of Compliance to SC-VTOL, the standards against which European and now UK manufacturers will design eVTOLs. Vertical continues working closely with the CAA on the Type Certification of its VX4 aircraft, having recently submitted its certification basis proposal to the regulator.

Taken together, this progress provides essential regulatory clarity to Vertical on the requirements for the development of its VX4 aircraft and

further discussions will continue with the CAA in coming months, including robust technical familiarisations. This positions the UK, alongside Europe, as a market with a clear regulatory framework for the design and manufacture of these novel electric aircraft.

Japanese validation

Vertical has also formally commenced its certification efforts in Japan, following the Japan Civil Aviation Bureau's (JCAB) acceptance of the VX4's validation programme. Successful validation of the VX4's Type Certificate will allow the aircraft to be operated in this key market. Vertical is well-positioned in Japan, having partnered with Japan Airlines (JAL), through the placement of up to 100 VX4 pre-orders with Avolon, as well as with Marubeni Corporation for up to 200 VX4 pre-orders. In January 2023, Marubeni made a pre-delivery payment to Vertical for the reservation of its first 25 VX4 aircraft delivery slots out of the 200 VX4 conditional

pre-orders. In March 2023, it was announced that Marubeni would be one of the operators of the Advanced Air Mobility showcase for the 2025 Osaka World Expo to fly with Vertical's VX4.

JCAB formally becomes the fourth aviation regulator Vertical is working closely with, including the CAA on Type Certification and concurrent validation with EASA and the US Federal Aviation Administration (FAA). Vertical is also in discussions with the National Civil Aviation Agency of Brazil on the VX4's future validation programme. The establishment of this broad coalition of regulators will enable Vertical to deliver the VX4 into service internationally, with its airline, helicopter operator, aircraft lessor, business aviation and tourism group customers.

Stephen Fitzpatrick, Vertical's Founder and CEO, said "I am immensely proud that Vertical is the first British electric aircraft company in history to receive a DOA from the UK aviation regulator. This approval is a critical step forward in our mission to decarbonise air travel and bring the UK's first electric aircraft to market. We are grateful for the CAA's commitment to advancing sustainable aviation, which allows us to build on the UK's proud aerospace tradition."

Paul Harper, Vertical's Head of Certification, said "Receiving a DOA from the CAA is a huge testament to our team and the hard work we are doing to ensure safety is at the core of the VX4. It represents a significant milestone on our journey to Type Certification and we would like to thank the CAA for their guidance and continued support.

I believe that in formally working with JCAB, as the fourth aviation regulator Vertical is committed to certifying with, we are on track for establishing the most detailed understanding of global regulators' needs and differences for eVTOLs. This will give us a competitive edge in bringing the VX4 into service."

Garry Lathey, Design and Certification Manager at the UK Civil Aviation Authority, said: "We are committed to enabling innovators such as Vertical take their ideas to market in a safe, secure and sustainable way. The granting of Design Organisation Approval to Vertical is an essential step on their journey bringing an eVTOL aircraft into service. It emphasises our commitment to making the UK a key destination for aviation innovators. It's also vital that this work has an international impact and so in all our efforts we aim to work collaboratively with other regulatory bodies around the world to support the future of eVTOL flight and maintain the high safety standards that the public expects."

Former Formula 1 Technical Director unveils Cargo Drone

Former Formula 1 Technical Director Mike Gascoyne has unveiled a Cargo eVTOL drone which has been developed as part of his companies Cargo Development Program. Mike Gascoyne previously served as Technical Director for teams including McLaren, Sauber, Renault and Toyota before setting Lotus F1 through his company MGI.

The prototype eVTOL showcases not only MGI's engineering prowess but a multi-faceted and multi-industry approach to the development of the cargo eVTOL. The company is moving into the newly-emerging cargo eVTOL industry space and hopes to bring a fresh viewpoint on how to develop the latest aerospace technology for these novel vehicles.

Mike Gascoyne CEO of MGI Engineering said: "We are really proud to announce our Cargo eVTOL technology demonstrator programme at this year's eVTOL Insights' Conference. We believe that developing sustainable electric aviation vehicles combined with our unique expertise and experience from Formula 1 of lightweight hybrid composite vehicles is the future of the transport industry and will ease the strain on current methods whilst decarbonising multiple sectors.

We are very happy to have a fully working demonstrator vehicle that has passed all our tests to date including fully transitioning from vertical to horizontal flight. We're excited to see where our development journey takes us and look forward to solving the unique and novel challenges the industry presents us with.

We also want to invite clients, partners and investors to join our vision to develop highly efficient cargo UAV solutions. MGI Engineering, as a cargo eVTOL consultancy service, understands in order to bring aerial vehicles successfully to market requires a multi-disciplinary team across multiple industries."

SkyDrive Receives Pre-order for SD-05 eVTOL Aircraft

SkyDrive Inc.a leading electric vertical takeoff & landing (eVTOL1) aircraft manufacturer based in Japan announced that TAIHO Co., Ltd. a total engineering company, signed a memorandum of understanding (MOU) and agreed on a pre-order of SkyDrive SD-05 for commercial use. Taiho is a member of newly established Public-Private Council2 for Advanced Air Mobility in Kagawa prefecture in Shikoku region.

SkyDrive is currently developing the SD-05 eVTOL aircraft to create a future where everyone has access to air mobility as their daily transportation. The company successfully completed in the first flight test in Japan in 2019, and its SD-05 is in the process of acquiring its Japan Civil Aviation Bureau (JCAB) certification3.

Taiho sells and maintains control or measurement equipment and performs electrical, communications, and civil engineering works for customers in various industries, including electric power, chemicals, oil refining, nuclear power generation, and paper manufacturing. In recent years, the company has been actively investing in new fields such as robotics, including the in-house development of automated driving and monitoring robots for the livestock industry.

The Shikoku region, where Taiho is headquartered, faces transportation and regional revitalization challenges. As a leading infrastructure provider in this area, Taiho believes that the electric and compact SD-05 can be a solution to these issues and has signed an MOU.

SkyDrive and Taiho are committed to bringing advanced air mobility to Shikoku. The two will work closely with all stakeholders, including flight operators, vertiports and power supply infrastructure providers to make this vision a reality.

Rotor X Aircraft Unveils First Video of DRAGON during Flight Testing

After a year of testing, Rotor X Aircraft has finally released video of the new ultralight eVTOL, Dragon Personal Air Vehicle from a flight test in the Arizona desert. This electric ultralight aircraft comes as a quick-build kit, doesn›t require a pilot›s license in the U.S. to operate, and is priced at just under $90k.

The video, taken in early 2023 during flight testing of a DRAGON pre-production prototype, does not show the ballistic chute safety cage. The safety cage will be integrated before the manned flights which are expected to begin in May.

The Dragon Personal Air Vehicle comes with safety features such as a ballistic parachute cage, auto hover, auto takeoff and landing, and redundant independent motors for its 8 propellers. Dragon flies for 20 minutes for pilots weighing up to 250 lbs (113 kg) and has swappable battery packs that recharge in less than two hours.

With over a year of testing, Rotor X Aircraft is ready to publicly display the Dragon this summer in Oshkosh for EAA's 2023 AirVenture. Testing and improvements on Dragon are ongoing and manned-flight videos will be released in June 2023.

Under the FAA's Part 103 Ultralight requirements, the Dragon Personal Air Vehicle doesn't require a pilot's license in the United States. Additional safety features include helicopter landing gear, ballistic chute safety cage, redundant independent motors, power system with independent batteries controlled by redundant flight controllers, automatic takeoff and landing, hands-off return to hover and position hold. DRAGON can hover and perform a safe landing in the case of a battery, electrical, or motor failure.

Rotor X Aircraft, based in Chandler, Arizona, is the world leader in affordable 2-seat helicopter kits and their decades of aircraft manufacturing experience are being leveraged in the design and production of the DRAGON.

Additionally, Advanced Tactics Inc. of Torrance, California pioneered the largest heavy lift multi-rotor technology since 2007 and has been assisting Rotor X with funding and personnel to make multi-rotor ultralight aircraft a reality.

Rotor X is now accepting deposits for the DRAGON at rotorxdragon.com. Due to the overwhelming response, the last slots for 2023 delivery of the production vehicle are nearly gone. For more information on DRAGON, contact sales at sales@rotorxdragon.com or call 602-429-9449.

Autonomous Cargo Aircraft Developer Natilus Begins Flight Testing

Natilus, a California-based aerospace start-up developing autonomous cargo airplanes, has successfully flown a subscale technology demonstrator for the first time. The company intends to introduce a family of remotely piloted cargo freighters featuring a unique blended-wing-body (BWB) design that will be capable of carrying more cargo than traditional airplanes of comparable size. Its initial offering will be the Kona, the smallest model in its planned fleet.

Natilus says the initial flight tests of its quarter-scale Kona demonstrator aircraft have validated the performance of the BWB design after three years of extensive wind-tunnel testing. The flights took off from a private runway in Southern California, east of San Diego. During the flights, the aircraft reached speeds of about 70 mph (110 kph), according to Natilus.

"The first flights were controlled by a remote pilot to validate 'open loop' aircraft stability without autopilot," a Natilus spokesperson told FutureFlight. "This is a huge milestone for aviation as, previously, BWBs were unstable and had to be flown with a 'closed loop' autopilot code." Natilus is now working to integrate its own autopilot system into the aircraft. While the company's cargo fleet will be highly autonomous, remote pilots in ground stations will monitor all flights and can take over control of an aircraft if necessary.

With six flight tests under its belt, Natilus is now shifting its focus to the construction of a full-scale Kona technology demonstrator, which will have a wingspan of 85 feet (26 meters). "We are fully focused on completing the full-scale Kona prototype," said Natilus co-founder and CEO Aleksey Matyushev. "Our Kona remotely piloted aircraft will be capable of carrying over 9,000 pounds (4.3 metric tons) of freight and will open new markets worldwide. The progress of Natilus in developing autonomous cargo aircraft is a game changer in the logistics industry, providing an efficient and cost-effective solution for shipping goods across oceans."

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