VOLUME 3 ISSUE 3

MILES TO NAUTS

Nov 2024

KUMARAGURU college of technology

AERONAUTICAL ENGINEERING ASSOCIATION AEA

Aeromodeling Club

INNOVATION

ELECTRIC AIRCRAFT

KNOW ABOUT THE **HISTORY** OF **PASSENGER FLIGHTS**

AEROSPACE STARTUPS

VECROS TECHNOLOGY

LIFE AND SCIENCE

PIEZO ELECTRIC EFFECT

FLIGHT Lt. HARITA KAUR DEOL

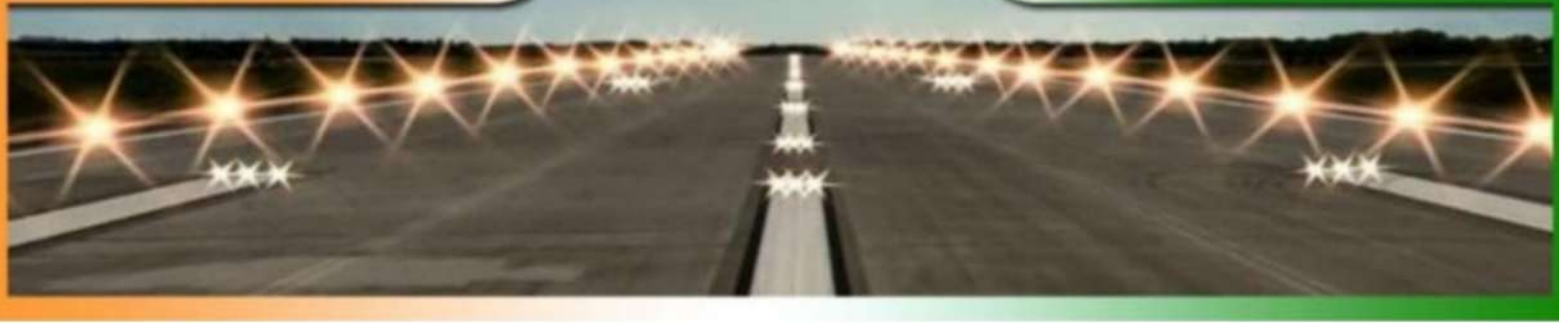
WOMEN PILOT - THE INDIAN AIR FORCE

ICON OF THE MONTH

INTERVIEW

CEO - VOID ROBOTICS

MR. NATHAN GEORGE



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MILES TO NAUTS

NOVEMBER 2024

Dear Readers,

We are ecstatic and privileged to have made our magazine, "MILES TO NAUTS" reach your hands. We have worked hard, and we've also had some incredible adventures along the way. Our magazine is the brainchild of students who are passionate about aerospace and dream of carving out a career in this challenging yet fascinating field. The magazine seeks to make a link between what people learn and what they practice in daily lives. We have put together facts, experiences, and information in this issue that will benefit anyone who flips the pages. The magazine aims to quench the intellectual thirst of anyone who is trying to constantly educate themselves and to motivate them to strive towards excellence. We hope and believe that you would be as thrilled and excited as we were while working on this magazine and will constantly render your support through your constructive criticism and continued readership.

Hope to see you soon,
Editorial Team, Miles to Nauts .

INDIAN AIR FORCE

On October 8th, 1932, the Indian Air Force was formally created and it's first official flight took place on April 1st, 1933, with just six officers trained in the RAF (Rapid Action Force) and 19 Havai air soldiers. Four Westland Wapiti IIA army cooperation biplanes served as the "A" Flight core of the envisioned No. 1 Army Co-operation Squadron at the inventory of aircraft at Drigh Road. Four and a half years later, "A" Flight supported Indian Army operations against insurgent Bhittani tribesmen for the first time from Miranshah, in North Waziristan.

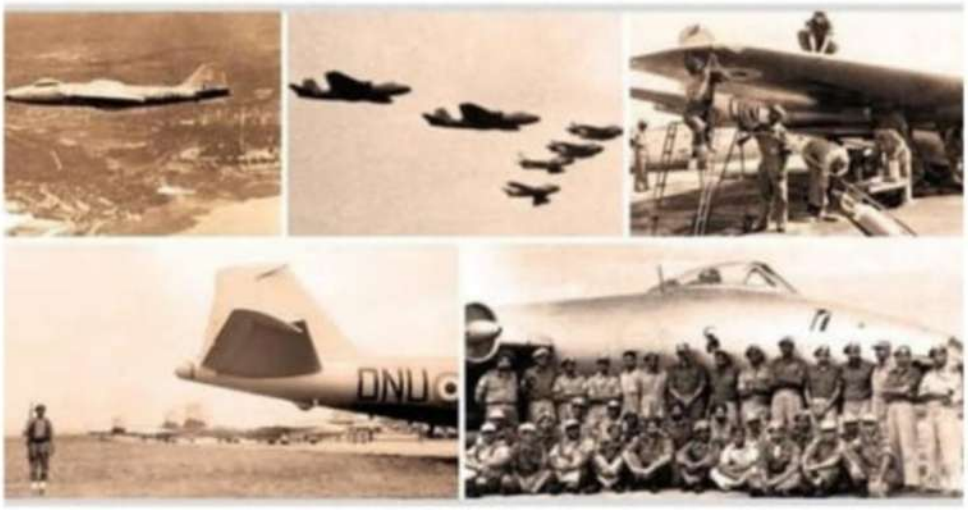


Figure 1- Indian air force

The Chatfield Committee re-evaluated issues related to the defense of India in 1939. Excepted for a plan to raise five flights voluntarily to aid the defense of the major ports, it suggested re-equipping RAF (Royal Air Force) squadrons based in India. However, it made no recommendations for quickening the IAF's slow growth. Thus, the creation of an IAF Volunteer Reserve was authorized. IAF Volunteer Reserve cadets were instructed on Tiger Moths by RAF flying instructors who were allocated to flying clubs as the need for an Indian training system grew.

INDIAN AIR FORCE

The year 1957, was particularly significant for the IAF because it saw the official start of the massive re-equipment program that would bring the Service completely up to international standards.

In 1971, the first time the IAF engaged in a limited war, which was previously believed to be an improbable scenario because air power was traditionally associated with an all-out conflict. As a result, Operation Safed Sagar marked a turning point in the development of military aviation and will undoubtedly be considered for the foreseeable future. The Indian Air Force Flying Officer Nirmal Jit Singh Sekhon, in honor of his lone defense of Srinagar Air Base against a Pakistan Air Force (PAF) air raid during the Indo-Pakistani War of 1971, he was posthumously given the Param Vir Chakra award, India's highest military decoration during wartime. He is the only Indian Air Force service member to receive the Param Vir Chakra award. For his brave action, Nirmal Jit Singh Sekhon is remembered, and statues of him have been built in numerous Punjabi cities and a marine tanker built in 1985 was named after him.

Figure 2- In September 1965, Mystere IVA armed with cannon rounds

HISTORY OF AVIATION

Passenger Flight

Havilland Comet

HISTORY OF AVIATION

Passenger Flight

Various fighter jets and planes were manufactured and used for World War II around the world. Among those are several unique aircraft originating from various countries.

United Kingdom:

In the United Kingdom, a prototype of the de Havilland Comet, the world's first jet aircraft, was built in 1949. The Brabazon Committee was established in 1942 in the United Kingdom by John Moore-Brabazon to foresee advancements in aviation technology and the post-war British Empire's and Commonwealth's air transportation needs. Multi-engine aircraft types were purportedly split between the US and the UK for British usage, with the US receiving military transport aircraft and the UK receiving heavy bombers.

The final report of the committee recommended four designs for the state-owned airlines British Overseas Airways Corporation (BOAC) and later British European Airways (BEA): three piston-powered aircraft of various sizes and a jet-powered 100-seat design at the request of Geoffrey de Havilland, who was involved in the development of the first jet fighters.

Following a brief competition, the Bristol Aeroplane Company was awarded the Type I design, which was based on a "100-tonne bomber" entry. The Bristol Brabazon evolved from this, but the project was shelved in 1951 after BOAC lost interest, and the first aircraft required an expensive wing redesign to accommodate the Bristol Proteus engine.

Type II was divided between the conventional piston designs of the de Havilland Dove and Airspeed Ambassador and the Vickers model powered by newly developed turboprops: first flown in 1948, the VC.2 Viceroy was the first turboprop design to enter service. Type III requirement resulted in the Avro Tudor and the more ambitious Bristol Britannia, both of which took a long time to develop, with the latter entering service with BOAC in February 1957, seven years after its order.

In 1949, the jet-powered Type IV was renamed the de Havilland Comet. With four de Havilland Ghost turbojet engines buried in the wings, a pressurized fuselage, and huge square windows, it had an aerodynamically clean design. The Comet took off on the world's first aircraft flight transporting fare-paying passengers on May 2, 1952, launching regular service between London and Johannesburg at the same time.Three Comets, however, broke up mid-flight around a year after their introduction due to airframe metal fatigue, which was not widely understood at the time. The Comet was grounded and tested to determine the cause, and competing manufacturers learned from the experience while designing their own planes. The modified Comet 4 series, which debuted in 1958 and had a productive 30-year career, concluded with the enhanced Comet 2 and prototype Comet 3.

Due to the Comet accident and a reduced domestic market in the 1960s, the UK had lost the airliner market to the United States, which was not reclaimed by later designs such as the BAC 1-11, Vickers VC10, and Hawker Siddeley Trident. The STAC committee was established to look at supersonic designs, and it collaborated with Bristol to develop the Bristol 223, a 100-passenger transatlantic airliner. To share the costs, the project was later integrated with comparable efforts in France to develop the Concorde supersonic airliner, in the United States, in September 1966, at Stapleton Airport, Denver, United Airlines DC-6.

United States:

C54 Sky Master

The C-54 Skymaster was the name given to the first batch of Douglas DC-4s that were delivered to the US Army and Air Forces. Following the war's end, some ex-military DC-6s were converted into airliners, with both passenger and freight variants flooding the market. Douglas also created a pressurized version of the DC-4 known as the Douglas DC-6. The Constellation, a triple-tailed aircraft with a bigger fuselage than the DC-4, was built by rival Lockheed.

The Boeing 377 Stratocruiser had a double deck and a pressurized fuselage, and it was based on the C-97 Stratofreighter military transport.

Convair built the Convair 240, a 40-seat pressurized airliner that flew 566 times. The Convair 340, which was somewhat larger and could hold between 44 and 52 passengers, was designed later, and 311 were constructed. The company also started work on the Convair 37, a very large double-deck airliner that would have covered transcontinental routes; however, due to a lack of customer demand and exorbitant development costs, the project was shelved.

The Martin 2-0-2 and Martin 4-0-4 were competitors, however, the 2-0-2 had safety concerns and was unpressurized, while the 4-0-4 only sold a few hundred units.
Then engines grew significantly larger and more powerful after WWII, and safety systems like de-icing, navigation and weather information were added to planes. American jets were said to be more comfortable and have better flight decks than European ones.

France :

In France, the French Air Ministry required transatlantic flying boats with a capacity of at least 40 passengers in 1936, which led to the introduction of three Latécoère 631s by Air France in July 1947. However, two of the planes crashed, while the third was taken out of service due to safety concerns. The SNCASE Languedoc was the first post-World War II French airliner. Between October 1945 and April 1948, Air France completed 40 aircrafts, each with up to 44 passengers seating capacity. In 1954, Air France retired the final Languedoc from its domestic routes, replacing it with newer designs. The four-engined Breguet Deux-Ponts was a double-decker transport for passengers and goods that first flew in February 1949. It was employed on some of Air France's busiest flights, notably those from Paris to the Mediterranean and London.

Latécoère 631s

USSR :

Most of the Soviet fleet of airliners after the war consisted of DC-3s or Lisunov Li-2s. These planes were in severe need of replacement, and the Ilyushin Il-12 took to the skies for the first time in 1946. The Il-12 was designed in a similar manner to the American Convair 240, with the exception that it was not pressurized. The Ilyushin Il-14, which was equipped with far more powerful engines, had its first flight in 1953.

The Antonov An-2 was the Soviet Union's most important contribution to airliners. Unlike most other airliners, this plane is a biplane, and it has sold more copies than any other transport plane.

INTERESTING FACTS

Aarohi Pandit was the first woman pilot to fly solo over the Atlantic and Pacific Oceans.

ICON OF THE MONTH

FLIGHT Lt. HARITA KAUR DEOL

Harita Kaur Deol was born on 10th November 1971, in Chandigarh, to a Sikh family. Her father, Colonel Deol was a servant of the Indian Army. Little is known about the early life of this officer, who made history by becoming the first woman pilot in the Indian Airforce to fly solo. Her journey began when the air force advertised eight vacancies in 1992. Over 20,000 female applicants from all over the country applied with enthusiasm. Out of these, 500 qualified for the entrance examination. Eventually, only 13 candidates were found worthy of the induction after a grueling process of exams, interviews, and medical tests. Harita Deol was one of them. These women were to be inducted into the transport fleet of the IAF. Till 1992, the IAF did not give its female pilots the freedom to fly solo. Though later, the Ministry of Defence made a revolutionary change in its policies by allowing women to be inducted as pilots.

Hailing from Chandigarh, she became one of the first seven women cadets inducted into the Air Force as Short Service Commission (SSC) officers in 1993. This also marked a critical phase in the training of women in India as transport pilots. After the initial training at Air Force Academy, Dundigal near Hyderabad, she received further training at Air Lift Forces Training Establishment (ALFTE)

Harita Kaur Deol

at Yelahanka Air Force Station.

On 24 Dec 1996, Flt Lt Harita was assigned to an operation as a co-pilot. Flt Lt Harita took off from Chennai in her HS-748 Avro aircraft as a co-pilot on a sortie from Chennai to Hyderabad. However, on the way to Hyderabad, the aircraft suffered technical glitches along with wing fatigue and crashed near Bukkapuram village in the Prakasam district of Andhra Pradesh.

In this ill-fated crash, Flt lt Harita lost her life along with 24 other personnel. Thus, the life of a fine Air Force officer and a committed soldier was lost in this unfortunate accident. Flt Lt Harita achieved the distinction of becoming the first Indian woman to fly a solo flight in the IAF but, unfortunately, also became the first woman Air Force pilot to die in harness in the line of duty.

INTERVIEW

In modern times, robotics has caused a great impact in the field of aeronautics and drones. Now, they coexist and evolve. Team Miles to Nauts interviewed Mr. Nathan George, the CEO of Void Robotics. Let us hear his experience on robotics, his vision towards the future of AI, drones and many more.

1.How did your journey start? When did you find out that robotics is your thing?

When I started, my school hasn't been familiar with robotics. In eleventh grade, there was a robotics team and I was very interested in it. One of my teachers was great support for me when I decided to start a club for robotics. I learned coding by myself for that. It did pretty well and I got my robotics degree in WPI (Worcester Polytechnic Institute) and I loved every second of it. Then I started Void Robotics – a company that finds, automates and delivers robots for your requirements.

2. You are a newbie in the business field. How are you managing the technical and business side of Void Robotics?

I think starting robotics is the hardest thing you could do considering the fact that Amazon has failed twice and statistics say that 90% of start-ups have failed. The most important thing to remember is if you are interested in starting a robotics startup most people think it's about copying what someone else did. It doesn't matter if you spend 100 million dollars funding in it. You could still end up with failures. In technical start-ups, almost 90% of the time should be spent on the business side of it trying to understand the market, your product, its need, and finally understanding the biggest failures. I've worked on a robotic kitchen, also I've worked on a visual SLAM (Simultaneous Localization and Mapping) robot.

The latter one is much more complex to build, but the former one had much more relatable audiences. This is the difference you will understand when you step into solving real-world problems. Work on very simple problems, instead of doing super complex things that can change the world.

3. In technical projects there is no surety of succeeding and finding a market. How did you manage to be on the same track without getting deviated when you faced failures?

Gary Vaynerchuk is one of the most influential persons in digital marketing and he says that knowledge of your customers is the latest and greatest need for your start-ups, so try a lot of things. I worked on a robotic ornithopter using deep learning enforcement and simulators. I realized though we were making progress, we were so far from making it to the market and building hardware was my thing. So, I quit it and started focusing on the projects I like. You can keep working on the house until it looks good by trying out different properties. But in the engineering field, if there is no R&D (Research and Development) at all, you won't succeed.

4. Are drones with adaptive morphology and bio-mimicry just for the aesthetical values or do they solve real-world needs?

In the current market, most of them are for show off than actual efficiency. If you look at it technically, they don't have increased flight time or endurance. They can last in the sky for 30 minutes maximum with 50% efficiency. If you work on the proper flapping of the wings, and make it 75-80% efficient, it's a great thing. People have worked on reducing the noise which is very good. Even in airports, they use these kinds of drones to scare the predators.

5.How do you see this sudden rise in the world's interest in these UAVs? Will the start-ups sustain the market race?

Every new technology will see a sudden rise and then come to a normal graph. Bringing a lot of innovations and creating something that'll stop many problems is a great thing to work on. But just make sure you can finish the whole project in a year. That's the key. If you take hydrogen fuel cells, you may not bring them immediately to the market, but in the next 30 years, they will solve the energy problems in the drone sector. Don't just work on projects that might sound cool, work on something that people will find easy to adapt, which will solve a basic problem in their day-to-day life. If your idea is taking too long and you don't know the endpoint, trash it and restructure.

6. There are many divisions that need the use of drones, like medical, surveillance, and agriculture. Which field do you think that UAV business should focus on immediately?

Well, it depends on the type of market we are dealing with. If it is a saturated market, such as the food industry, looking at people's wants will be beneficial. But a flourishing industry needs dominant wants. For example, vacuum cleaners, when produced, weren't that important to anyone. But as time went, they realised that they needed vacuum cleaners so that their work is done easily. So as I said, it ultimately depends on the target market.

7.There is always a fear of robots replacing humans. In that circumstance, how do you see the future of AI and Robotics?

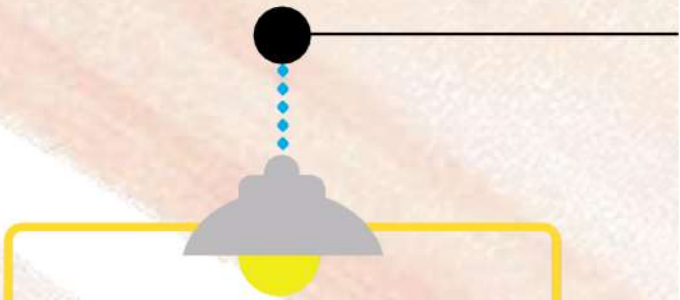
This is a question even I have been thinking about for a long time. It is absolute that once AI and robotics are evolved, they will replace at least 50% of humans. Although we will have robots controlled by humans, there lies a bitter truth that people will one day, run out of jobs. But I guess it depends on how well we adapt to it. It is like the agricultural revolution. When modern technology like drones was introduced, some adapted to it, and it caused an upheaval. The greatest advantage is that a person with knowledge in AI and robotics can get a job anywhere. I recently saw a post on Linkedin where a person who was not able to afford education learnt web development and is now working full-time. Hence even though robots are a replacement for humans, the job opportunities that will open is tremendous.

8. What should a team primarily focus on to be in a good position in the market of Robotics and Drones?

We must focus on the needs and determine whether the project is truly necessary. It is essential to assess its usefulness and feasibility. Instead of constantly seeking new solutions, we should prioritize improving existing ones. Ensuring that the product is beneficial should always be a priority. Additionally, we must strive to acquire the necessary knowledge in the most efficient way, spending the least amount of time possible.

9. There are a lot of hardware engineers in Robotics and Drones. But software development is an integral part. How do you find the balance between both?

In reality, it is 10% hardware, 5% others, and 85% software—no matter what anyone says. In these fields, if we lag behind in the software aspect, we are as good as dead. Therefore, software undeniably dominates everything else. When we recognize, accept, and move forward with this understanding, we will find the right balance.



INTERESTINGFACTS

The shortest commercial flight in the world is in Scotland, which is a flight between two islands in Orkney, Scotland, and completes its flight in about 53 seconds.

INNOVATION IN AVIATION

Electric aircrafts

Businesses from fledging start-ups to aviation giants and government agencies like NASA, are very actively indulged in the building of 'Electric aircraft' for both commercial and defence purposes. The electric aircrafts, expected to be common in five years, reduces fossil fuel consumption while tackling conventional problems like more fuel or power for greater altitudes. The noise and exhaust emission reduction also contribute heavily to its competition in the world of aviation.

The only downside to an electric aircraft is that it is heavier than a regular aircraft owing to heavier Li-Ion batteries.

E-VTOL

E-VTOL (Electrical Vertical Take-off and Landing) aircraft is the new craze of the industry with AeroMobil and Lilium taking centre stage.

E-Vtol

AeroMobil is a concept of four-seater electric plane which turns into a conventional car on land. It can seamlessly transform from car to an aircraft in under 3 minutes of time. This high-end vehicle has already completed thousands of hours of flying in the real world.

Aeromobile

Lilium is a small all-electric VTOL that was developed in Germany, where the lift is generated traditionally by propellers, but the propellers are rotated via purely electromagnetic means.

Lilium

ROLLS ROYCE

Rolls-Royce have been discussing that they would develop a small aircraft by 2025. The company, however, doesn't intend to manufacture battery cells. The company's President Rob Watson explained that the first commercial application system will have a power output of 600-kilowatt hours with an 8-passenger capacity for 80 nautical miles. They are working towards improving their range with better battery technology around 2030s.

EHang AAV

EHang AAV (Autonomous Aerial Vehicle) is an Electric Passenger-grade AAV, which is superior to the traditional manned aircraft. EHang AAV follows three philosophies or concepts,
1.Full redundancy to ensure security.
2.Autonomous pilot.
3.Centralized control of the intelligent command-and-control center.
This EHang AAV provides low-altitude short and medium-haul transportation solutions for future intelligent transportation.

Models:

1. EHang AAV 184(predecessor).
2. EHang AAV 216.

Specification:
EHang AAV 216 can carry two passengers and has a maximum takeoff weight of 600 kg with a maximum payload of 220kg. It has an aircraft width of 5.61m and height of 1.77m. EHang AAV can able to cruise at a maximum speed of 130km/h.

Propulsion Details:
EHang AAV 216 contains 16 electric motors which are connected to 16 propellers. EHang AAV has propeller blades in a coaxial double-bladed design.

EHang AAV 216

Development details:
In 2018 in Qatar and the Netherlands, a demonstration of EHang AAV 216 was conducted initially. Ehang and FACC aim to manufacture up to 300-3000 air taxis in Austria between 2020 and 2025. EHang also plans to start its local production in North America and Asia.

Technology

EHang AAV eliminates the possibility of failure and it also can be able to rectify the malfunction that was caused by man-made errors, without any concern about controlling or operating the AAV. It provides Real-time Network Connection. Routes in flight will be surveyed in advance having pre-set multiple feasible plans for the pilot. EHang has the best communication of 4G/5G high-speed wireless transmission channel to communicate smoothly within the command and control center.

VTOL:
EHang AAV plans to use VTOL (Vertical Takeoff and Landing) by visual positioning. By this, EHang AAV doesn't require a large airport or runway. It is suitable for urban air mobility without air traffic.

VTOL by EHang AAV 216

Power Option

EHang AAV operates on electric power, addressing a major concern associated with other air vehicles. By utilizing electric power, it eliminates pollution caused by gas emissions. Additionally, EHang integrates a Battery Management System (BMS) that enables real-time communication with the aircraft, ensuring efficient power management and safety.

Electric Green Power

Command and Control Center:

EHang AAV has a set of intuitive command and control systems that provides the five core functions which are

1. Monitoring
2. Dispatching
3. Controlling
4. Early warning
5. Centralized management

This smart Command and Control Center comprehensively manage the aircraft.

EHang AAV 216

Safety Ensurance of EHang AAV

EHang AAV has a FAIL SAFETY SYSTEM which already has multiple redundant protection plans. By these plans, the system can monitor each airborne device and acquire its health and operating condition. If there are any abnormalities in that data, the smoothest route will be selected and executed by the algorithmic pre-set logic that can take a passenger to a destination.

Testing and certification

EHang has been granted by the certificate of AS9 100D which is issued by the International Aerospace and Aviation Quality Management System Standard after successfully completing hundreds of testing subjects which include static test, loud ground test, reliability test, environmental test, durability test, etc.

Future application by EHang AAV:

1. Passenger Transportation
2. Logistics
3. Aerial Sightseeing
4. Medical Aid

INTERESTINGFACTS

Tokyo Narita airport has the smallest runway, which is used only for landing.

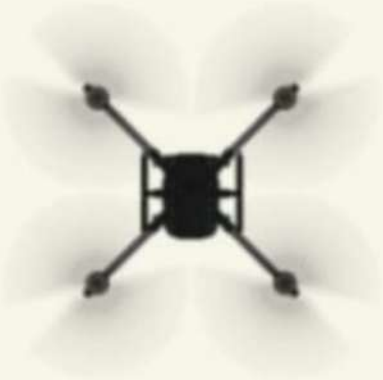
AEROSPACE STARTUPS

VECROS TECHNOLOGIES

Vecros Technology is a robotics company that provides inspection for industries through Computer vision and Autonomous Systems. A group of friends from IIT Delhi started the Vecros Technology in 2018. The diverse friends specialized in Machine Learning, Aerial Robotics, Control Volume, Sensors, and Autopilots. Headquartered in New Delhi their main investor is 100X.VC. In Pre-seed funding, they raised about 5 million INR with 14 employees working day in and day out.

Vecros technology is working on Industry based Artificial Intelligence applications focused on surveillance, and optimization and provides solutions for mining, agriculture, construction, and oil and gas industries. They are the first company in India to develop Artificial Intelligence for edge drone systems.
Replacing GPS with Computer vision and AI remains their standing accolade. Their journey started with them winning the 100X.

VC with added professional training in various sectors to be developed for a start-up. Today they are working on a flagship drone of India, which is powered by AI supercomputer



Agile robot from Vecros Technology

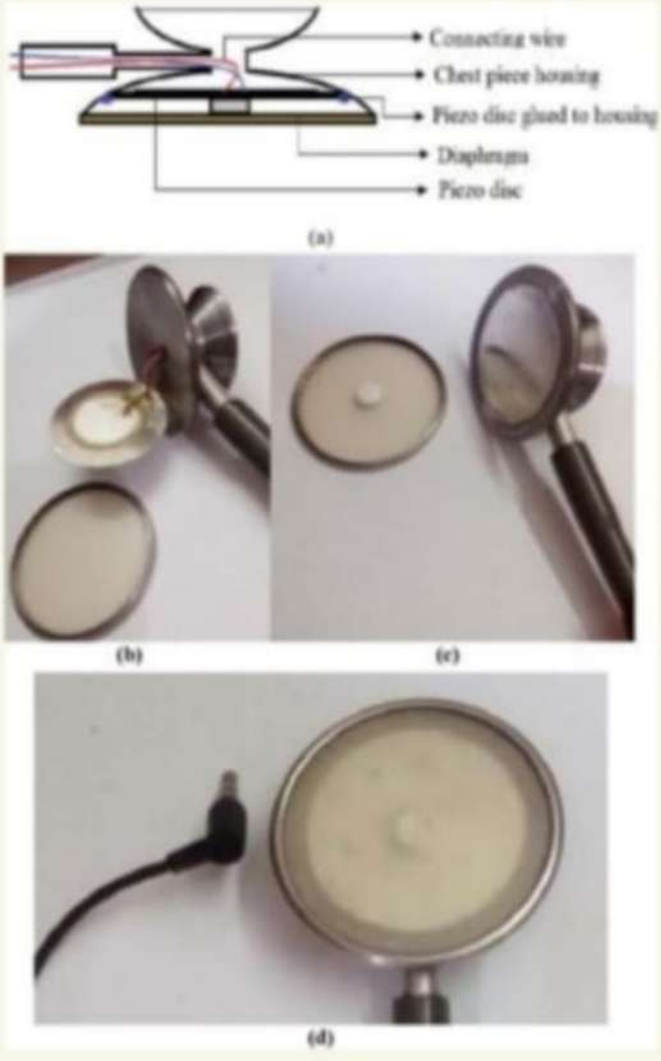
consisting of 358 cores, 4k video processing and 2 deep learning engines. The JETPIX is the Operating Software used in their product. JETPIX is state-of-the-art operating software. The OS was developed at IIT Delhi. It is integrated with navigation technology, with the help of AI and computer algorithms for making quicker decisions
They have achieved a lot in the year 2020. Vecros participated in the Incubator program conducted by Foundation For Innovation And Technology Transfer (FITT) Incubation, won the Sterlite Incubation challenge, took part in an incubator program conducted by Innocity Online Booster by startup OASIS and also took part in the incubator program conducted by Mobility Startup Incubation by NSRCEL and Maruti Suzuki India Limited.

LIFE AND SCIENCE

PIEZOELECTRIC EFFECT

WHY THE DOCTORS USE STETHOSCOPE?

Walking across the hallway to a medical clinic, the curious kid in me decided to ask the doctor present on how a single instrument aids in figuring out almost any disease. To which he laughed and replied, "It is used to assess the heart, lungs and bowels of a patient by listening to the internal sound in their body".



Piezoelectric Stethoscope

Diving deeper, I understood, a Stethoscope converts sound waves into electric signals. This stethoscope contains a chest piece which is made up of different materials like aluminum, chrome, brass and stainless steel. Apart from this, the stethoscope contains a piezoelectric material which is solely responsible for the generation of electric signals.

CHARACTERISTIC OF PIEZOELECTRIC MATERIALS

A piezoelectric material works under the principle that if and when a stress is introduced, there will be some mechanical deformation due to which electric voltage will be generated. While looking the material in a molecular level, the piezoelectric material is a kind of crystal. Usually, a crystal consists several unit cells. Unit cells are the smallest structure which is repeated to get the whole crystal. Once a mechanical stress is applied, the molecules in the unit cell starts elongating. This separates the positive and negative charged atoms in the unit cell. This separation causes a voltage difference in the crystal lattice. Crystal lattice is nothing but the combination of number of unit cells. That voltage difference in turn generates electricity, that we call piezoelectricity.

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MILES TO NAUTS

HOD's NOTE :

Dr. M SENTHIL KUMAR

I am delighted to note that the Students Association of Department of Aeronautical Engineering and the Aeromodelling Club have taken initiatives of releasing Department Technical Magazine "Miles to Nauts". The magazine will be platform for the students to present their findings, collection of technical information, current affairs in the field of Aeronautical, Aerospace and Allied Engineering. Releasing of magazine will be helpful in many ways such as dissemination of knowledge to all the students, networking , communication, leadership skills, updates on activities of the department etc. I wish the technical magazine should carry many more useful information beneficial to all the students and provide a new dimension of growth to the department.

STAFF COORDINATOR's NOTE :

Mr.DARSHAN KUMAR.J

Every dreamer is not necessarily a doer and every doer is not always a dreamer. Life gives us numerous chances and opportunities to begin fresh and flourish. These happy thoughts shall brighten up each mind reading the journal. Have fun combining intellect and writing, enjoy every moment of this journey.Best wishes for your new initiative.Let our journal reach from one mile to 1000s of nauts through your mighty words.Let this endeavour touch the sky with glory .

VISION OF THE INSTITUTE

The vision of the college is to become a technical university of International Standards through continuous improvement.

MISSION OF THE INSTITUTE

Kumaraguru College of Technology (KCT) is committed to providing quality Education and Training in Engineering and Technology to prepare students for life and work equipping them to contribute to the technological, economic and social development of India. The College pursues excellence in providing training to develop a sense of professional responsibility, social and cultural awareness and set students on the path to leadership.

VISION OF THE DEPARTMENT

To attain excellence and global reputation in Aeronautical Engineering Education and Research.

MISSION OF THE DEPARTMENT

- The department is committed to provide quality education in Aeronautical Engineering to students to build their career and do quality research and thus contribute to the field of Aviation and Aerospace.
- The department aims to prepare students for their higher studies and research to contribute to the advanced technological needs of Aeronautical engineering.
- Encourage faculty to update their knowledge and teaching-learning process through continuous learning.
- Undertake inter-disciplinary research to contribute and support the industry.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

The Program Educational Objectives of Aeronautical Engineering Undergraduate Program are to prepare the students:

I. To pursue a successful profession in leading organizations.

II. To pursue postgraduate degrees and conduct research at leading technological universities to contribute to the advancement in the field of Aviation and Aerospace industries.

III. To continue their professional development by utilizing educational and career building opportunities through their employer, educational institutions, or professional bodies.

PROGRAM OUTCOMES (POs)

Graduates of the Aeronautical Engineering Undergraduate Program should have the ability to:

PO 1: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7: Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

Graduates of the Aeronautical Engineering Undergraduate Program will have the ability to:

PSO 1: Apply concepts and principles of Aerodynamics, Aircraft Structures, Aircraft Propulsion, Aerospace Materials, UAV and Avionics to provide solutions to critical industrial problems.

PSO 2: Use the software packages in the design, manufacturing, testing and maintenance of aeronautical and aerospace-based components and systems