VOLUME 3 ISSUE 4

MILES TO NAUTS

NOV 2022

KUMARAGURU college of technology
character is life

AERONAUTICAL ENGINEERING ASSOCIATION AEA

Aeromodeling Club
Kumaraguru College of Technology

INNOVATION
BOOM TECHNOLOGY, THE BOEING TTBW

KNOW ABOUT
THE HISTORY OF AVIATOR AND ROCKET PIONEER

AEROSPACE STARTUPS
SATELLIZE

LIFE AND SCIENCE
SCIENCE BEHIND BALL POINT PEN

ICON OF THE MONTH
REGINALD JOSEPH MITCHELL
BRITISH AIRCRAFT DESIGNER

INTERVIEW
CEO - JANE AEROSPACE
MR. LEO PETER CHARLES

TABLE OF CONTENTS

MILES TO NAUTS

NOVEMBER 2022

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 .

HISTORY

AVIATOR AND PIONEER

THE FATHER OF AVIATION

Sir George Cayley

Sir George Cayley (27 December 1773 – 15 December 1857) 6th Baronet was an English engineer, inventor, and aviator. He is one of the most influential figures in aviation history. Many consider him to be the first truly scientific aerial explorer, as well as the first to comprehend the basic principles and forces of flight and the first to invent the wire wheel. He proposed the modern airplane as a fixed wing flying machine with distinct lift, propulsion, and control systems in 1799. He is regarded as "the father of aviation" because of his contributions to aeronautical engineering.

Weight, lift, drag, and push are the four forces that act on a heavier-than-air flying aircraft. On his father's death, the 5th baronet, Cayley, of Brompton-by-Sawdon, near Scarborough in Yorkshire, acquired Brompton Hall and Wydale Hall, as well as other holdings. He was drawn to a wide range of technical tasks by the optimism of the moment. Self-righting lifeboats, tension-spoke wheels, the "Universal Railway" (his term for caterpillar tractors), automatic signals for railway crossings, seat belts, small size helicopters, and a prototypical internal combustion engine powered by gunpowder are just a few of the many items he invented (Gunpowder engine).

He proposed that instead of gunpowder, a more practical engine could be created employing gaseous vapours, thus foreshadowing the contemporary internal combustion engine. Prosthetics, air engines, electricity, theatre architecture, ballistics, and optics were among his many contributions.

George Cayley invented the hot air engine in 1807, according to the Institution of Mechanical Engineers: "Cayley's was the first effectively running hot air engine, in which much creativity was demonstrated in addressing practical obstacles stemming from the high working temperature." In 1837, he built his second hot air engine, which was a precursor to the internal combustion engine: "Sir George Cayley, Bart., Assoc. Inst. C.E. used the results of combustion from closed furnaces to act directly on a piston in a cylinder in 1837. Plate No. 9 depicts a pair of engines based on this idea that produces 8 horsepower while the piston travels at 220 feet per minute."

Cayley died in 1857 and was buried in the Brompton-by-Sawdon cemetery of All Saints' Church. In Scarborough, he has a hall of residence and a teaching building named after him at the University of Hull, Scarborough Campus. He is one of many scientists and engineers at Loughborough University who had a hall of residence and a bar named after them. Cayley's contribution to the founding of the University of Westminster is also recognized with a gold plaque at the Regent Street building's entrance. Cayley's exploits are commemorated by display boards and a video film at the Royal Air Force Museum in Hendon, as well as a modern exhibition and film "Pioneers of Aviation" at the Yorkshire Air Museum in Elvington, York. The Sir George Cayley Sawling Club is a free flight club situated in North Yorkshire that has been related to the British Hang Gliding and Paragliding Association since 1975.

Robert Hutchings Goddard (Rocket Pioneer)

Robert Hutchings Goddard (October 5, 1882 – August 10, 1945) was an American engineer, professor, physicist, and inventor who is credited with creating and building the world's first liquid-fueled rocket. Goddard successfully launched his rocket on March 16, 1926, which ushered in an era of space flight and innovation. He and his team launched 34 rockets between 1926 and 1941, achieving altitudes as high as 2.6 km (1.6 mi) and speeds as fast as 885 km/h (550 mph). Goddard's work as each theorizer and engineer anticipated several of the developments that might build voyage potential. He has been known as the person United Nations agency ushered within the time. XIII 2 of Goddard's 214 proprietary inventions, a multi-stage rocket (1914), and a liquid-fuel rocket (1914), were necessary milestones toward the voyage. His 1919 treatise a technique of Reaching Extreme Altitudes is considered as one among the classic texts of 20th-century rocket science and physicist with success pioneered trendy ways like two-axis management (gyroscopes and dirigible thrust) to permit rockets to regulate their flight effectively.

Although, the sphere was revolutionary, physicists received very little public support, ethical or financial, for their analysis and development work. He was a shrinking violet, and rocket analysis wasn't thought of as an acceptable pursuit for a physics academic. The press and alternative scientists ridiculed his theories of the voyage. As a result, he became protecting his privacy and his work. He is most popular to figure alone conjointly due to the aftereffects of a bout with TB.

Robert Hutchings with his rocket (7th Nov 1936)

CONTENT FOR SPACE:

Years after his death, at the dawn of the time, physicists came to be recognized mutually as the institution fathers of recent applied science, at the side of Henry M. Robert Esnault-Pelterie, Konstantin Tsiolkovsky, and Hermann Oberth. He did not solely recognize ahead of time the potential of rockets for atmospherically analysis, trajectory missiles, and spacefaring however conjointly was the primary to scientifically study, design, construct and fly the prophetical rockets required to eventually implement those ideas.

NASA's physicist house Flight Center was named in Goddard's honor in 1959. He was conjointly inducted into the international region Hall of Fame in 1966, and the International House Hall of Fame in 1976.

INTERESTING FACTS

Alaska Airlines was the first airline to introduce online check-in in 1999

ICON OF THE MONTH

R.J Mitchell

Hello Readers!

It seems like you found the Answer! I'm R.J. Mitchell. Dive into the paragraph to know more about me.

RJ Mitchell was born on May 20, 1895, in the United Kingdom. He was popular as an English Engineer. An engineer who designed the Supermarine Spitfire Fighter used in WWII. He started to work as an apprentice for Kerr Stuart & Co. at age 16. His spirit was the topic of the film The First of the Few.

RJ Mitchell plays a major part in G.I. Generation. This generation had experienced the youth during the Great Depression and rapid technological innovation. The initials "G.I." is a terminology used in the military known as "Government Issue" or "General Issue".

In 1919, Mitchell was made as chief designer. For almost two decades. Mitchell was able to design more than 20 aircraft for the company. Supermarine had specialized in producing seaplanes or--"flying boats"--and Mitchell improved the company's solid reputation in that field. He designed an armed flying boat named Southampton--based on a previously designed called the Swan--and the British military establishment was impressed with Mitchell's design and then ordered six of them.

The RAF equipped six of its squadrons with it and it remained in service for more than a decade, making them a pioneer in marine aviation and making, Supermarine into a profitable concern.

Branching out into high-speed aircraft design, he developed the Sea Lion. It is a small biplane flying boat that won the 1922 Schneider Trophy race with an average speed of more than 145 mph.

He entered the race the next year, He was tremendously impressed with another entry, the American Curtiss seaplane, which won the race. Mitchell began to develop a series of float planes and finally came out with a series of four streamlined crafts. The S5, of them, won the Schneider trophy in 1927; then in 1929, its successor, the S6 took it and the final one, the legendary S6B won the race in 1931, with an average speed of 340 mph (it eventually set a world speed record of 407.5 mph). Mitchell was awarded the CBE for his contribution to high-speed flight in 1932.

The innovations and quality of Mitchell's craft made him the top aircraft designer in England, and in 1923, Supermarine signed him to an unheard-of ten-year contract. He became the technical director of the company in 1927. In 1928, He was so valuable to the firm that when Vickers took over Supermarine, Mitchell would be bound to the new company, which was one of the non-negotiable terms of its purchase, without having the option to leave on his own, until 1933.

INTERESTING FACTS

The wingspan of the A380 is longer than the aircraft itself. The wingspan is 80m and the length is 72.7m.

Do you know the first native American Woman pilot also known as " The Only race Aviatrix in the world"? No? Keep Guessing until we meet again!

INTERVIEW

JANE AEROSPACE CEO
LEO PETER CHARLES

Leo Peter Charles

1. Being an aeromodeler right from your college days, you have great experience in that field. If you could give the aspiring aeromodelers some advice, what it would be?

I started aeromodelling during my NCC days. I am an alumnus of NCC, in the flying squadron in the state of Karnataka. Once I joined engineering, I developed an interest in this area. Unfortunately, at my university, we did not have a comprehensive subject where we were taught to design aircraft in general. This triggered me, to be not able to say that I can design an aircraft. So, I turned to aeromodelling. I built my first fixed-wing in 2010, a 7- foot, high-wing, IC engine-powered aircraft. From then on, my hobby became my business. It's been 12 years and I'm still in unmanned space. Those days, electric components were expensive, and batteries were expensive. Today, a lot of techs are available at a low cost. So start small, attend many competitions, and remember that any aircraft you see flying today started as a scale-down model, and almost everyone working in the subscale division is an aeronautical engineer. So, there is so much potential. Try building more models, mostly in groups and keep at it consistently and most importantly, be patient.

2. How do you see the evolution that has happened in the sector of aeromodelling from fuel-powered to electric to hybrid?

If you ask me, I still prefer IC engines. But today everything is electric. Mostly Li-ion but hydrogen is coming through too. These give better, longer, cleaner flights (hydrogen mostly). Hybrid multi-rotors lead to more vibrational dampening. In engines, smaller ones won't work well in the long run, and we don't need four-stroke engines. The pro is that in long endurance VTOLs if the forward propulsion is engine based, it would be very efficient. But I believe hydrogen will be superior to all the above-mentioned sources.

3. What is the one gap you identified during your transformation from an aspiring aeronautical engineer to a dronepreneur?

There are 2 main career options after graduation. You either work somewhere or it's a start-up. When you work with any firm, the technology there is 10 years ahead of what you learn in college, so you must fill that gap in a short period. The syllabus, due to regulations, evolves once in 6 years but technology evolves every second. The aeronautical engineering syllabus is heavily built on mechanicals. So, our work is mostly done by mechanical engineers. If some amount of programming is implemented at the college level, it would benefit the engineers. I believe that in every engineering college, we must have a model aircraft built. And more practical examples and learning would do better than exams.

If the method, thought process, and atmosphere are the same as school, that would make us no different than the others. This reduces the time spent on training in corporates. Building entrepreneurs should be our main aim. The engineers must be trained in technical and management skills, finance, and conducting a start-up. We should start building ecosystems right from college. The third scope for improvement is that the learning must be problem-based. Engineers should be trained to build solutions. So, these are some things I found, that can be improved in college. So, if these aspects are changed, we can make aviation a better industry.

4. There are 2 types of aero modelers: some people build a mathematical model, then analyse it, and then build the aircraft. Then some people build aircraft based on experience and approximation. Which method, do you think, is the correct one?

Both these methods are correct, in my opinion. There are 2 older aero modelers in Bangalore. They build aircraft on approximation. They have been doing it for 50 years and their models work perfectly. So, after you keep working on something, your brain stores the data, and once you encounter that, you answer or plan stuff on the spot. You know what to use for a particular thrust or lift. The mathematical modelers care about the smallest diameter change. They study about this and so they need the exact calculations of everything. But the people who go by approximation just need their model to work. They don't work on the minute changes happening in the modelling. So, I would say that both of these groups are right in their perspectives.

5. Why couldn't we set up a manufacturing drone manufacturing unit in India, what is stopping us?

In the drone space see the challenge is, that the drone ecosystem doesn't have everything being manufactured here, 90 % of the components are still imported. So, everybody is pretty much an assembler and we have designers, the challenge is critical components like motors, we only now have companies that have started manufacturing motors in India, the electronic speed controller is imported, the battery is imported, flight controller imported, payloads are 100% imported, so these are certain challenges because of the ecosystem what happened is between 2013 and 2018 drones were banned in India and because of that there was not a lot of growth what growth you are seeing now is all post 2020. How do you build an entire ecosystem in 2 years, it's not possible it will take some time. Also, there is a lot of scope for electronic engineers in the avionics sector and computer science engineers in the automation sector.

When I started in the industry it was about 2 or 3 companies manufacturing in India, but today the number has crossed 30 and when we started the total drone ecosystem was about 20 companies today. We'll be seeing more manufacturing companies come or we'll see better drones come in the next 4 to 5 years.

6. How much is the real-time contribution of drones currently on the Army and Navy sides? Are we deploying them in real-time for surveillance and cargo shipping?

Yes, we are ready. I am talking about small category drones anything between 20 to 25 kg. You must have read Idea forge has got contracts, alpha designs, Zen technologies have got contracts on the armed forces for providing surveillance drones, swarm systems. So, the army is already procuring, I think close to 400-500 crores of orders are already being placed with Indian companies for providing these drones and today trials are still going on for delivery drones to be able to move like equipment, arms, and ammunition, food, medical supplies all of this to borders, in the terrains of the Himalayan region whenever required. If you would have asked 5 years back, we were not, but today we are.

7. How much effort do we have to put to match the current global market in the drone delivery sector?

We had the disadvantage of drones getting banned in India for 5 years. We have already done extensive trials with ICMR for vaccine delivery, Swiggy is starting trial delivery for groceries, and Indian post has started deliveries. Why zipline was a very successful model is that they were the only guys there and it was in Africa, with no local competition, and they were funded. We were not able to raise funds until 2018 so all drone companies except one or two might have raised, but now the tides are turning and then we'll be able to get it going. The best part of India is our population, anything that you can work in India can work anywhere in the world, and secondly, we can go immediate large-scale in India, our biggest asset is our population.

8. India's becoming a global drone hub. What are the few fields in the drone sector that we need to master to hold that position?

Good question, one thing is we need to manufacture the semiconductors here I think that is happening but will take some time. Second, we need an easier training regiment than what is there, right now it takes a lot of processes. Third is more consumer drones to come into India and one of our tragedies in our drone industry is we don't have one single manufacturer producing consumer drones like how DGI or portal makes it won't have consumer drones at all and we are still dependent on those drones. That sector will also need to be focused, today most of the companies build drones for the government sector and the government is still the largest client for the drone companies, this needs to be changed we need to start building products for the common masses that will make a lot of sense.

Let us say if we can sell to 10% of 50 crore population that'll be 5 crore systems in India you can now see the enormity of the entire business case, and I am coming just coming up with random statistics, but you can see why it is easier to become a unicorn in India, it is because of the sheer population we can build largescale solutions and evaluations. So, for us to become a drone hub, we need to have the right ecosystem.

So, what we are dependent 80% to foreign countries comes down to 20%, second is good training processes in place to train personal to develop skill, third is more relaxation in some rules were used, fourth is more export friendly, See China is a very export aggressive country that's why they can build large-scale solutions. We need to become something like that, and the government will have to come up with policies, this is my personal opinion I may be wrong maybe right I don't know this is what I feel from understanding the industries.

9. If the manufacturing of semiconductors started earlier, India would have far more advantages in any sector not only in the drone field say electronics or mobile manufacturing, and it would have been far ahead of a few leading countries how do you see that?

We can always claim a lot of events telling if they have done this earlier it would have been better, we do not know the situation, we don't know if geopolitically the technology was being made available, we don't know, the important point is we should ensure right now we shouldn't miss anything, for example, the nuclear technology it was available since 2000 till then we still tried a lot of things on our own with some help from outside. But for us to truly become independent one major thing is we need to put in money, R&D and the government needs to give money to organizations, it might sound controversial but for private organizations, we can create useful R&D that can help.

Today our R&D spending is bad, and our R&D spend philosophy is bad that needs to be changed, without R&D we will not move ahead, putting money in R&D is always an investment, and lots of government and private organizations need this perspective, and that way we'll be able to get a lot of solutions, take for example fintech you can get a loan without any paperwork, fintech has made it possible but they put a lot of work to understand this process, that way we need to start putting money into R&D of other sectors so that the same question doesn't need to be asked after 30 years ahead into the future.

10. Talking about the R&D units there are a lot of drone start-ups in India as you said and there is no way for a monopoly to come here because there are a lot of talented engineers or common people starting up the start-ups or a lot of people working on a lot of solutions in the drone field but for those start-ups to do R&D its quite tough, obviously R&D requires a lot of money so if these start-ups are ever ready to get connected with the universities or institutions students can work on the R&D part and with the result, the industries could provide a solution do you think that this will scale up tremendously and quite easily?

Yes and no the problem is R&D needs funds the biggest challenge or start-ups face is capital that needs to be made easier. See, you need to understand what advantage China has over India, the land doesn't belong to a particular person it belongs to common people i.e., everyone, so rent is pretty much nil. Second China's workforce is highly skilled and costlier than India's workforce, and they always produce for gain.

In India start-ups can work with universities the challenge is that the university ecosystem is not built for industrial work, it works like an academic institution how can we bring industrial thought processes or work culture into them, we can have incubation centers but outsource 2 students who are at the university this process needs to be able to find you, this is what I feel, but most importantly capital is needed, somebody has to give money for the R&D because, if you take 100 start-ups if you see the founders of 100 start-ups, 90 start-up founders will be from the middle class, where is the money with the middle-class people, there is no money if you need money you will have to go the bank and get a loan and today's lending rates are very high.

So, founders need money the capital must be set up and the other problem is the start-up fund is available but it takes a lot of time for you to get, and before you get the money you have to prove something to do so you'll be spending from your pocket now how do you bridge this problem, if a salary to the family is not able to provide the money for you to create your prototype, they are only stuck with the idea. So, this paradox needs to be sorted, by providing some amount. By setting aside 5000 crores for the people who come up with start-ups or with a better idea that can be implemented by the government, because one start-up is successful at least 100 families or 100 young people could get a job and be in safer hands. So, it is very important to grow the ecosystem. Let's say for example Tata company closes, the economic crisis will be huge, or Adani group closes so large companies have this time, but MSN is always there and act as the shockproof agent for our economy, this can create a lot of opportunities, at last, that's why it's very important.

11. What is the next step Janes aerospace is taking in the drone sector?

Some companies can build products and some companies can provide services, but nobody is listening to the customer and their problems, everybody is building mapping, surveillance, and agriculture drone. Today drones have more than 250 applications and in India, only 8 applications are addressed, what about the rest? So, this is what we are trying to solve, we are going to customers, address the problem statement, and build a solution. More solutions and more use cases mean better sales, better service, and better solutions. Apart from that we must train at least 10,00,000 people and help them to have a better life. Flying is always fun and fascinating, rural youth need to be able to access this technology and make it happen. So, this is something we are moving towards building an ecosystem that can help the drone industry grow faster and wider even outside India and that's our thought process and vision.

INNOVATION

BOOM TECHNOLOGY

A rendering of Boom Supersonic's Overture jet.

INTRODUCTION

Boom Technology, under the trade name Boom Supersonic, is an American company developing Mach 1.7 (1,800 km/h) supersonic aircraft with 6588 passengers. Boom Overture called The Passenger Plane is expected to have a range of 7,870 km and will be reached in 2029. Y Combinator was incubated in 2016, and Boom Technology has raised $51 million in 2017 and $100 million in venture capital by January 2019. The Boom XB1 Baby Boom 1/3 scale demonstrator began its flight testing in 2022.

BOOM SUPERSONIC

Boom Supersonic, which travels ultra-high-speed aircraft that it believes will lead to the revival of commercial supersonic flight, has selected Greensboro, NC for the manufacture and testing of these aircraft.

The Greensboro plant, which is expected to employ 1,750 people by the end of the decade, is the latest example of a new aircraft manufacturing facility built in the region. Over the last 11 years, Boeing and Airbus have built a new final assembly plant in North Charleston, South Carolina, and Mobile, Alabama, respectively.

"This was the right choice for us, and we couldn't get any more excited," Blake Scholl, founder, and CEO of Boom Supersonic told CNBC. "Greensboro brings a significant local population with a skilled workforce, and the state has more than 200 aerospace suppliers." They will be the major suppliers of The Overture.

THE OVERTURE

"The first commercial supersonic aircraft in the boom is the overture" The company plans to begin construction of the aircraft in 2024, with the first aircraft rolling off the assembly line in 2025 and the first test flight scheduled by 2026. If all goes according to plan, the world's first supersonic jets will be in commercial service by 2029. One of North Carolina's slogans, "First in Flight," pays homage to the Wright brothers, who made their first flight in Kitty Hawk.

In a press release announcing the boom plant, the state's heritage is praised by Governor Roy Cooper. "It's poetic and logical for Boom Supersonic to choose the first state to fly for its first manufacturing facility," he said. But Boom is based in Denver and continues to develop aircraft at its headquarters, but due to its short distance from the Atlantic coast, it chose Greensboro. School said "The proximity to the sea is an important factor"

Boom said, "Most of our flight tests are done on the water where the aircraft can accelerate, so there are no overcrowded areas with sonic booms", with a top speed of Mach 1.7, or about 1,300 miles per hour, Fly in. This allows you to save hours on some of the longest international flights. For example, according to the company, From Tokyo to Seattle the new plane will fly in four and a half hours instead of the usual eight and a half hours of flight time. Fifteen overture supersonic aircraft have been ordered by United Airlines.

THE BOEING TTBW

Boeing designed an aircraft that is more aerodynamic and fuel-efficient. In January 2019 they first unveiled their new Transonic Truss-Braced wing supported by a lightweight, ultra-thin and more aerodynamic wing concept. Boeing studied the idea of TTBW with the collaboration of NASA as a part of the Subsonic Ultra Green Aircraft Research program. If all goes to plan, Boeing predicts we could see planes like this taking to the skies as soon as 2030 – 2035.

TTBW

In 2019 the result of wind tunnel testing at NASA Ames Research facility, an optimized TTBW found out which is more sweep for the 170ft (52m) span wing allowing flying higher and faster and it reaches Mach up to 0.80, the fuel burn rate of TTBW aircraft is reduced by 8-10% compared with cantilevered wings type aircraft. In January 2019 at the AIAA conference the design was presented.

The Boeing TTBW

SPECIFICATION

Boeing mentioned a few specifications for TTBW aircraft which are Aspect ratios up to 27, The wing folds outboard of the truss to use airport gates for the 118ft (36m), The wing has 20° of sweep and was moved forward. The truss section is tapered with an increased root chord. A 1.5 MW (2,000 hp) electric motor/generator.

DESIGN CHALLENGES

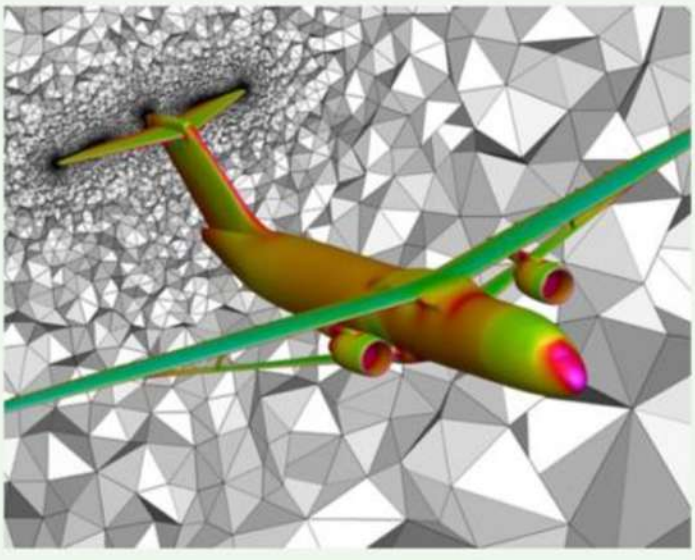
According to Harrison Boeing's design involves a lightweight 170ft span (52m) folding wing atop an aircraft's fuselage and supported by a truss composed of two major struts and two smaller jury struts. An extended wing with a high aspect ratio causes wabble and results in dangerous conditions (flutter) while flying the aircraft, by doubling the wing Aspect ratio they reduce induced drag caused by lift so that they design an AR as high as 27.

WIND TUNNEL TESTING

High-speed testing has already been undertaken using scale models, within the NASA Ames Unitary Plan wind tunnel. Of course, with any ground-breaking redesign of the way we expect aircraft, there will be extensive certification challenges to beat. Boeing noted that it will have to consider issues like tolerance to bird strikes, crashworthiness, and icing effects, among others, in future evaluations of the concept.

Scaled model of TTBW

CFA



CFD over TTBW

AIRCRAFT

The above image shows the fluid analysis over a TTBW aircraft which says the concept aircraft's aerodynamic properties. On the airplane itself, the red and violet colors show areas of upper drag, and therefore the green and blue show areas of lower drag. The triangular, pyramid-looking "cells" represent airflow around the aircraft, helping scientists understand the vehicle's aerodynamics and improve its efficiency. Aircraft concepts just like the TTBW are a part of an initiative by NASA and industry partners to create aviation cleaner and more sustainable in this case, by creating less drag and burning less fuel.

CONCLUSION

Boeing with the collaboration of NASA predicts we could see the TTBW planes like this taking to the skies as soon as 2030-2035. The Boeing Transonic Truss-Braced Wing (TTBW) airliner is looking to rewrite the rulebook on how planes are designed which visibly reduces the fuel consumption rate and increase aerodynamic features.

INTERESTING FACTS

The air inside an airplane is much drier than the earth. You are about 7 percent of the distance to space during flights.

AEROSPACE STARTUPS

SATELLIZE

Satellize is the first Indian private space company to have a satellite in space. Currently, there are two satellize satellites in the orbit around the Earth.

Satellize was formerly known as Exseed Space. The current satellites' names, Exseed Sat-1 and Exseed Sat-2 are the world's first commercial satellites.

Satellize was founded in 2018 and it was launched in December 2018.

Mahesh Murthy, an Indian marketer, entrepreneur, and investor, founded it. He also founded the digital agency Pinstorm. And Ashhar Farhan, entrepreneur and investor in India's first two space missions, Chandrayaan-1 and the Mars Orbiter Mission, Lamakaan (cultural centre), BITX (open-source HF radio), and Daana (an online platform for Small and Marginal Farmers).
To start from the beginning, Garden Cafe in the southern city of Hyderabad was where it all began. Two of our founders were school-age boys who were members of literary clubs. One questioned, the other debated, and they eventually met over inevitable cups of cutting tea at Hyderabad's most famous café.

Among them, one was a radio amateur who enjoyed listening to satellites and lecturing his college seniors on RF electronics. The other was an astronomy enthusiast who rode a tiny moped a hundred kilometres to a large aperture telescope to get a better look at Halley's Comet as it swung around.

Satellize workers building their Satellite.

After 25 years, when both were successful tech entrepreneurs, one's company purchased the others in 2008. Then they discussed building a satellite, laughed at their ridiculous idea, and moved on to other things.

After five years they were asked to mentor an Indian space start-up. And the ridiculous bubbled up again.

In 2016, one of them was approached about putting together a venture capital fund focused on hardware, and he thought about Space – and called the other.
They talked again, banded together again, and decided to start companies for the fund to prove that the fund was a good idea in and of itself.
The first company they thought of was one that built satellites, and their first port of call was to acquire the start-up they had once mentored and bring in that team.

After a few months, they had their first satellite!

First Satellite – Exseed Sat-1

In December 2018 their first satellite was launched into space via SpaceX's Falcon 9 from the Vandenberg air force base in California. It was a cube 0f 10 centimetres which can generate an average of 2.8 watts of power using solar cells.

SECOND SATELLITE:

Second satellite - Exseed Sat-2

Among the many satellites launched on ISRO's PSLV C45 mission on April 1, 2019, is the world's first satellite developed by an Indian company.

Exseed Sat-2 has a few world firsts:

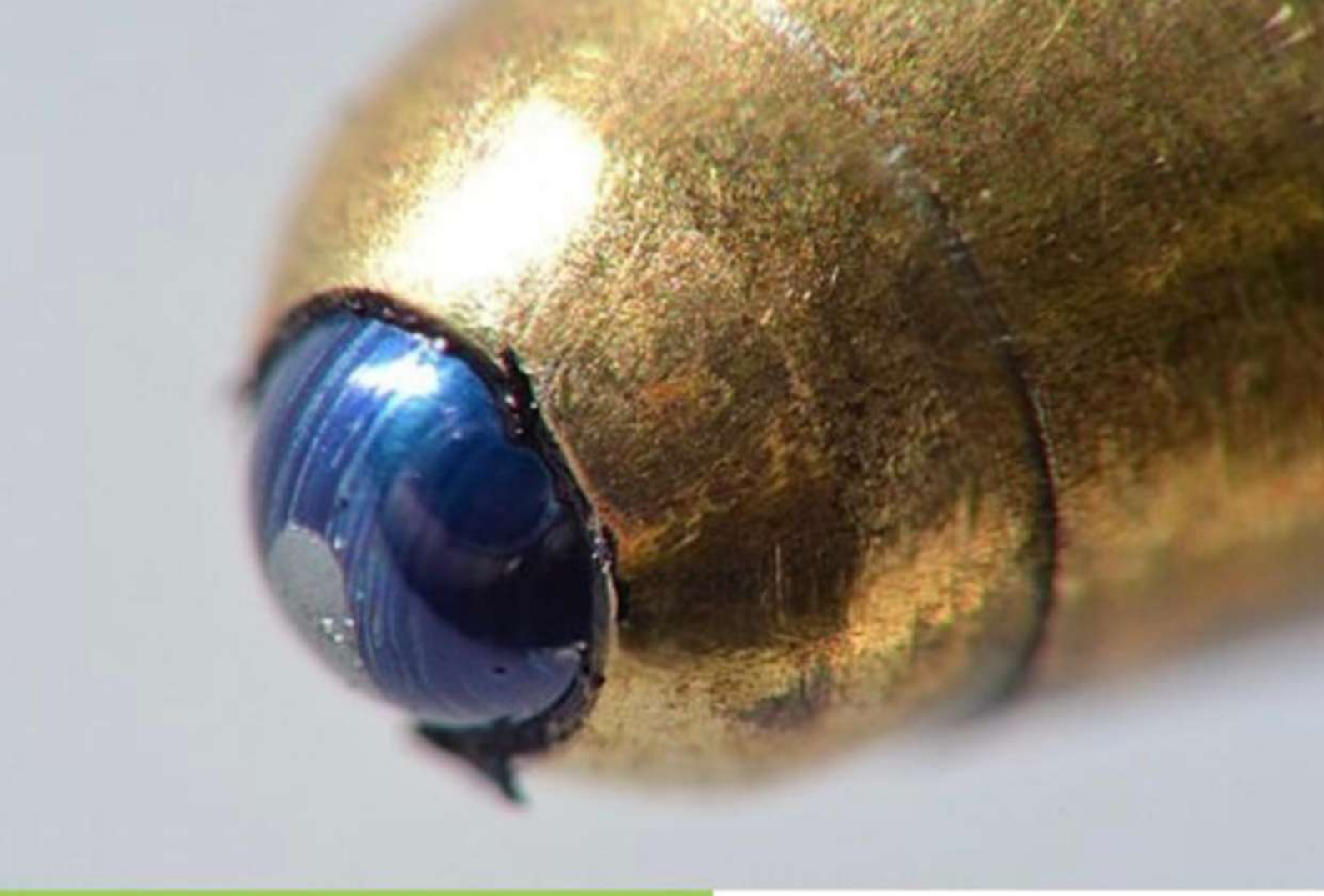
- World's first commercial & professional use of ISRO's revolutionary Stage 4 Platform.
- World's first professional-grade satellite that was made without a power system and also an antenna.
- World's fastest documented manufacture of a satellite, built from start to finish in just 6 working days altogether.

Satellize team with their satellite.

Recently, the company has actively focused on creating solutions for the Indian Defence Sector in 2020, among other things, by participating in India DefExpo 2020.

INTERESTING FACTS

KLM Royal Dutch Airlines is the oldest airline in the world and was founded in 1919.



SCIENCE BEHIND

BALL POINT PEN

A ballpoint pen works by surface tension and gravity.

Consider a student, just stepping into the exam hall with a ballpoint pen. He is very confident that he has studied very well for the exam. And after receiving the question paper, he is very happy because the question seems very easy for him. And with that happiness, he just started writing.

But at this moment, the ink is not flowing out properly, and he is not able to write the answers. He is crying. And he needs help.

Can't this pen be used anymore? The answer is no. This pen can be used when surfactants are added to the ink in that pen. A surfactant reduces surface tension when it is mixed with fluids. As a result, it improves the spreading of the ink.

The gravitational force also plays a major role. The ink in the pen will flow towards the pen tip as you tilt the own downwards while writing.

And once you start writing, the ball on the tip rotates due to friction with the paper, thereby the ink flows out of the minimum area and then gets poured on the paper in the desired way.

So, now the problem with the student's pen must be with the surface tension. The surface tension of the ink in his pen is very high. That is why he is not able to write the exam.

Surface tension is the tendency of the fluid surfaces to get shrunk according to the minimum area which is provided. The surface tension of the ink is a key factor that decides how effectively the ink spreads over the ball present on the tip of the pen.

The higher the surface tension of the ink, the less would be the distribution of ink on the ball.

As a result, the pen won't spill ink out. The lesser the surface tension of the ink, the larger would be the distribution of ink on the ball.

As a result, the pen will spill a lot on the paper. For a good pen, the value of surface tension should be an intermediate one.

Apparently, ballpoint pens don't work well for "lefties". this is because while writing the left-handers push instead of pulling the ball across the paper. and this inhibits the ink flow.

Flow of ink through a ballpoint pen

The largest ballpoint pen was made by Acharya Makunuri Srinivasa (India) and was presented and measured in Hyderabad, India. It measures 18 ft 0.53 in length.

In World War II, pilots used ballpoint pens because they do not leak at high altitudes. During the Apollo 11 expedition, Buzz Aldrin and Neil Armstrong used a pen's cap to resolve a machine's fault. It literally saved their lives.

INTERESTING FACTS

On average, the human body loses 1.5 litres of water during a three-hour flight!

QUIZ

1) Among 250 applications of drone worldwide, how many are utilized in India?

2) State True or False: Hybrid Multi-rotor leads to vibrational dampening

3) How can aircraft/drone models be built on approximation, without mathematical calculation and analysis?

4) Percentage of components imported in India:

A) 30%
B) 60%
C) 45%
D) 90%

5) What is the biggest challenge organizers of starts-up face?

Answer:

1) 8

2) True

4) 90%

3) After you keep working on something, your brain stores the data and once you encounter that, you answer or plan stuff on the spot. As you work more and more on a particular object or model, your brain does the approximation by itself. You know what to use for a particular thrust or lift.
[PEOPLE WHO BUILD MODELS ON APPROXIMATION:]
The oldest aeromodellers in Bangalore, there are 2 people. They build aircrafts on approximation. They have been doing it for 50 years and their models work
perfectly.

5) Lack of funds

Start-up fund is available, but it takes a lot of time for you to get and before you get money you have to prove something to do so you'll be spending from your pocket now how do you bridge this problem. by providing some amount of 5000 crores to set aside for the people who come up with start-ups or with a better idea which can be done by government, because one start-up is successful at least 100 family or 100 youths could get a job

SUDOKO

QUESTION

6	5	9		1		2	8	
1				5			3	
2			8				1	
			1	3	5		7	
8			9					2
		3		7	8	6	4	
3		2			9			4
					1	8		
		8	7	6				

SUDOKO

QUESTION

6	5	9	3	1	4	2	8	7
1	8	7	6	5	2	4	3	9
2	3	4	8	9	7	5	1	6
4	2	6	1	3	5	9	7	8
8	7	1	9	4	6	3	5	2
5	9	3	2	7	8	6	4	1
3	1	2	5	8	9	7	6	4
7	6	5	4	2	1	8	9	3
9	4	8	7	6	3	1	2	5

REFERENCES

HISTORY:

- https://en.m.wikipedia.org/wiki/Airliner
- https://en.m.wikipedia.org/wiki/Brabazon_Committee
- https://www.google.com/urlsa=t&source=web&rct=j&url=https://www.britannica.com/technology/history-of-flight/The-first-airlines&ved=2ahUKEwjbqcjWtYf3AhXWSWwGHaekBHsQFnoECB4QAQ&usg=AOvVaw1hVFZG-cSzeX0R0Dwingo0
- https://www.google.com/url?sa=t&source=web&rct=j&url=https://www.space.com/16657-worlds-first-commercial-airline-the-greatest-moments-in-flight.html&ved=2ahUKEwjbqcjWtYf3AhXWSWwGHaekBHsQFnoECBsQAQ&usg=AOvVaw2zfnn1wDb4Y9nvgQT6kG6q

ICON OF THE MONTH:

- https://m.imdb.com/name/nm5759136/bio
- https://en.m.wikipedia.org/wiki/R._J._Mitchell
- https://www.britannica.com/biography/R-J-Mitchell
- https://dingeraviation.net/spitfire/spitmich.htm

AEROSPACE STARTUPS:

- https://www.ehang.com/ehangaav/
- https://www.aerospace-technology.com/projects/ehang-216-autonomous-aerial-vehicle/
- https://youtu.be/dl-g13ZHD_s?t=25

LIFE AND SCIENCE:

- https://www.semanticscholar.org/paper/Stetho-phone%3A-Low-cost-digital-stethoscope-for-Fattah-Rahman/18cc270deb6daafc083d0a085cfc56d68835e0e2/figure/0

Miles to Nauts

History


Kathiravan
19BAE037


Sheik Imran
20BAE039


Shafana Asiya
21BAE046

Icon of the month


Deepa
19BAE056


Anandh
20BEE009


Gopinath
21BAE203

Innovation


Selvaramanan
19BAE055


Sarooth
20BAE036

Interview


Mahima Swetha
20BMC025


Hemanth Nithis
20BAE010


Jaishri Prathiksha
21BAE017


Akhila Ajith
21BAE003

Aerospace Startups


Udhayakumar
19BAE043


Sabareesh
20BAE031


Janani Priyadarshini
21BAE19

Life and science


Jeeva
19BAE011


Anusuya
20BAE003


Mohankumar
20BAE032

Facts and Science


Sandhiya
20BAE032


Srivathshan
20BAE041

Editing


Sneka
19BAE052


Kirubanidhi
20BAE015


Ansu susan
20BEC012


Shiva shanmugan
21BME047


Rohan
20BAE039

Design


Varshini
20BAE047


Kadhir Narayanan
20BAE013


Agalya
21BAE002


Ramyakumari
21BEC109


Jenita
20BAE022

HOD's NOTE :

Dr.M.SENTHIL KUMAR

I am delighted to note that the Students of the Aeromodeling 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 :

Dr.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