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EMANATION

MECHANICAL DEPARTMENT NEWSLETTER

-MECHENAS

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MAY 2017

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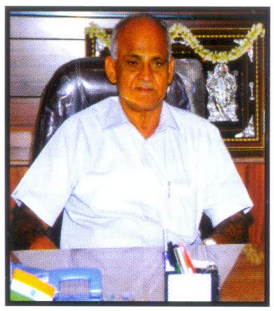

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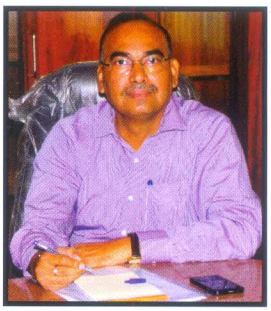


Sri D Rukmangada
Treasurer

We are very pleased to know that the Mechanical department is launching its Sixth edition of newsletter Emanation. At the outset, we congratulate the department and specially the newsletter committee for their efforts in bringing out the newsletter. The newsletter is an amalgamation of all the events held in the department and it plays an instrumental role in providing a great exposure of all the achievements accomplished by the student's and the faculty.

GOOD LUCK

Making a difference. As we have said in these pages, KSIT – EMANATION is on a roll. Engineers turn ideas into reality, they question, explore, invent, discover and create. Our increasing recognition is evident by the enormous success of our staff and students effort in contributing their rich services in several structures. KSIT – EMANATION is expressing in its own way, the hidden talents of young minds. The contents in this newsletter definitely highlight the exciting activities of staff and students in all domains of engineering. I personally thank everyone for their effort in bringing out the Sixth volume of EMANATION which contains useful information and also am looking forward to hear from all readers, who would like to share with us.

Dr. T. V Govindaraju
Principal / Director

I am happy to note that the Department of Mechanical Engineering is bringing out yet another newsletter. Being one of the old Departments of the institution with well qualified and experienced faculty, the Department of Mechanical Engineering is continuously contributing for the overall development of the institution. The Department is encouraging the students in various academic, co curricular and extracurricular activities. Hence, the Department is able to produce Rank holders in VTU exams in different academic years as well as receive honor in various activities in the state and national level. There are different Students teams for participating in SAE BAJA competition and GOKART competition. These teams have secured one amongst the top five positions in the state level and have brought Laurence to the Department and institution. The release of this News Letter is one more such active step of our students and faculty. I understand that the theme focused in the present News letter is the latest developments in the field of Aerospace Engineering. I congratulate the entire editorial team for their efforts in bringing out this News letter.

Dr. K. Rama Narasimha
Professor and Head
Mechanical Engg

Thought from Editors

Greetings and a warm welcome to our sixth edition of 'EMANATION'. Emanation began as a dream back in March 2014 and since then each edition has emerged as a new dimension at the college level through publishing various articles, photos and information. We have tried our best to include content that would appeal to all sections of people and we will continue to do the same. This edition is about aeronautics. It mainly consists of al advancements and developments happening in the aeronautical field.

While there is an aim to provide updated information that invokes and inspires, a quality that is central to 'EMANATION', it is just not about the words, it is imagery and spacing between that enhances the exchange, where content can be felt as well as understood.

As a team, we would also like to acknowledge the contribution of everyone who made these issues possible. We hope you have a nice time reading the same.

- Team Emanation

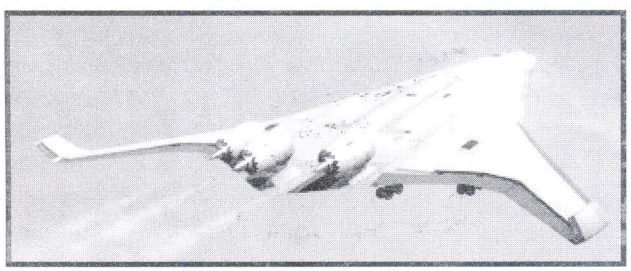
INTRODUCTION

Whether flying a conventional aircraft that features a global positioning system (GPS), a navigation receiver or a new aircraft with the latest integrated "glass cockpit" advanced avionics system, you should find this newsletter helpful in getting started. The arrival of new technology to general aviation aircraft has generated noticeable changes in areas of: information and automation. Pilots now have an unprecedented amount of information available at their fingertips. Electronic flight instruments use innovative techniques to determine aircraft attitude, speed and altitude, presenting a wealth of information in one or more integrated presentations. A suite of cockpit information systems provides pilots with data about aircraft position, planned route, engine health and performance, as well as surrounding weather, traffic, and terrain.

AIRPLANES TO FLY ON TWISTABLE WINGS

More than a century ago, the first aviation pioneers figured out a way to use rigid wings with flaps to generate enough force to lift a heavy craft into the sky. It was one of the great advances in human history and also the beginning of a new era in transportation. Airplanes and the airline industry that depends on them, are now among the world's largest businesses, with air travel producing over US $700 billion in annual revenues.

However, commercial airlines spend more than 25 percent of their operating expenses on fuel, earning the industry a reputation for razor-thin margins that will eke out just $39 billion in profits this year. Meanwhile, modern aircraft wings and engines have reached near-peak levels of efficiency, making it exceedingly difficult for engineers to generate additional savings. Yet there is one promising strategy that remains—changing the shape of the aircraft wing during flight.

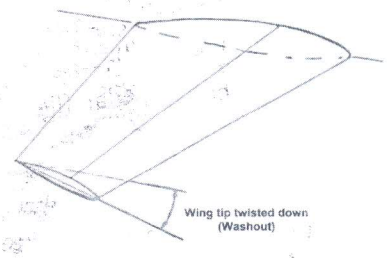


For three decades, engineers at aerospace companies, universities and defense labs have been working on twist able aircraft wings that could be instantaneously and minutely adjusted to improve fuel efficiency. With these wings, aircraft designers could get closer to optimal performance by increasing the airplane's lift-to-drag ratio, which is a measure of aerodynamic efficiency, in response to variations in speed, altitude, air temperature, and other flight conditions.

This modern pursuit has a notable historical precedent. Way back in 1905, Orville Wright steered the bro her's pioneering airplane by lying prone in a saddle and twistir g the tips of the plane's fabric-and-wood wings with a sway of his hips. Soon after, as aircraft became heavier, engineers switched to stiff wings controlled by rigid flaps and ailerons and morphing these surfaces proved impractical.

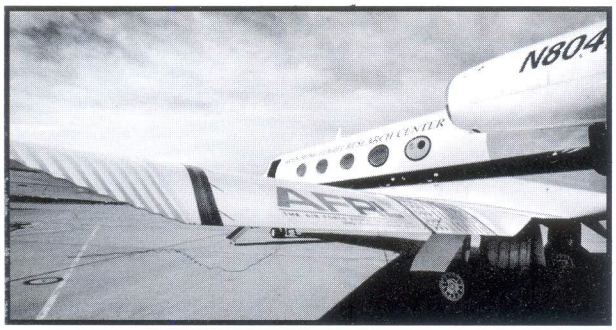
Decades later, in the mid-1980s, the U.S. Air Force tested Mission Adaptive Wings that were built by Boeing and installed on an F-111 aircraft. An automated control system reshaped the thin outer covering of these wings to change their curvature, thereby reduced the drag by up to 20 percent, for supersonic flight. Unfortunately, the added weight and power requirements for this technology made the aircraft less efficient overall. From 1996 to 2005, the U.S. Air Force collaborated with NASA to develop an Active Aeroelastic Wing, which used the power of the airstream to twist itself for better roll control during high-speed maneuvers. But that technology was intended only for fighter jets, and the program eventually lost support.

Since then the flexible wing concept has matured greatly. Which gave rise to building a shape-changing control surface that in recent tests, conducted with the technology installed in place of traditional flaps on the wings of a Gulfstream III jet, reduced drag to a degree that could improve airplanes' fuel efficiency by up to 12 percent. The flexible surface adjusted the curvature of the wings' trailing edges to deliver an optimal lift-to-drag ratio throughout the test flights, whereas flaps on today's airplanes pivot to generate lift or drag only during takeoffs and landings. In addition to saving fuel, analyses by NASA and other researchers have shown that this surface could also lead to quieter landings and possibly even less turbulent flights.



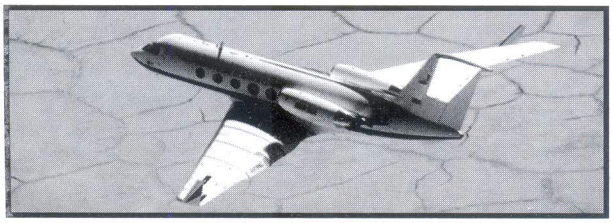
DID YOU KNOW ?

The wing-span of the A380 is longer than the aircraft itself. Wingspan is 80m, the length is 72.7m.



Photos: NASA and the U.S. Air Force retrofitted this Gulfstream III aircraft with FlexFoil, a flexible wing technology, for a series of 22 flight tests over NASA's Armstrong Flight Research Center in Edwards, Caliph that began in 2014.

Shape-changing control surfaces installed on airplane wings' trailing edges can improve fuel efficiency, reduce noise, and lessen turbulence during flight. These surfaces will replace traditional flaps entirely on brand new planes or be integrated into existing flaps on today's commercial aircraft.



Flexible wings solve an old problem in fixed-wing flight. Airplanes need the right blend of lift and drag to handle changing flight conditions. Generally, a pilot's goal is to reduce drag in order to preserve fuel. However, an aircraft's wings are designed to produce minimum drag at only one particular flight condition, which is determined by the aircraft's anticipated cruising weight, speed, altitude, and range. The flaps and other control surfaces can be adjusted only in relatively crude increments to improve the lift-to-drag ratio as conditions change.

Unlike traditional wings, though wings with shape-changing control surfaces can minimize drag for a wide range of conditions—a feat that has never before been achieved in commercial flight. The most advanced version of this technology will be integrated into existing flaps along the wings trailing edges on retrofits or installed in place of flaps on new planes. If all goes well, traditional wings are planned to be replaced in commercial airliner within the next three years.

The initial flash of inspiration for flexible wings came into light by observing the windshield wipers swish back and forth, and their shape did not fit the face of the glass. It was noted that even when designing a wiper for a curved windshield, engineers still use straight, rigid parts connected by joints prone to wear and tear.

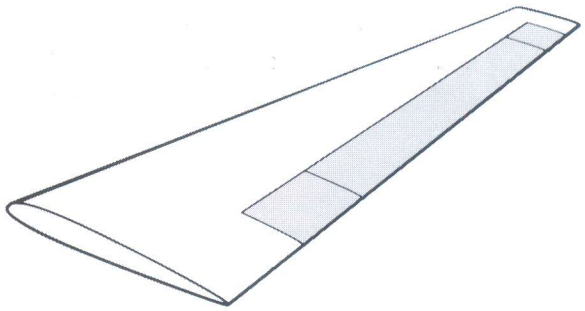
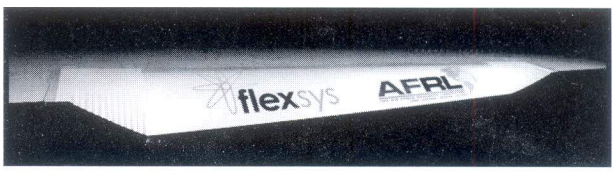


Photo: For takeoff, FlexFoil bends down by as much as 40 degrees to maximize an aircraft's lift-to-drag ratio. While cruising, FlexFoil can gradually flatten the wing's camber (or curvature) to save fuel. When encountering turbulence, FlexFoil can rapidly twist into new shapes to redistribute heavy loads. For example, a flight control system can simultaneously raise one end of the control surface and lower the other end [above]. To minimize drag, FlexFoil fits seamlessly against a wing's trailing edge with web like connectors at each end that stretch as the surface changes shape [below].



The traditional aircraft wing is a relatively rigid structure with various movable control surfaces: flaps, ailerons, and spoilers. Flaps, which are panels on the trailing edge of the wing, are used during takeoffs and landings to generate lift at low speeds. Ailerons are segments on the trailing edge near the wing tips. Operated in pairs, one on each wing, they cause one wing to go up and the other to go down, to make the aircraft roll into a turn.

Spoilers are panels on the top of the wing that, when rotated upward, increase drag and quicken a plane's rate of descent.

Although these control surfaces work quite well, they can only pivot rather than morph their shape. Flaps are typically not deployed during flight because their joints and hinges are full of gaps, which would cause too much drag. Though some new airliners allow pilots to make minute adjustments to ailerons and flaps to reduce drag while cruising, pilots still can't truly tailor the aerodynamic performance of traditional wings in response to warmer temperatures, higher altitudes, or stronger wind speeds. The result is not unlike riding to the top of a hill on a bicycle in the wrong gear—you may get there, but with considerably more effort than if you'd switched to a lower gear. A plane could switch gears, so to speak, and achieve a more optimal lift-to-drag ratio by changing the shape of its wings. To understand how this would help, first consider how wings generate lift.

A standard airplane wing is more curved on top than on the bottom, so that it diverts masses of air downward, providing lift. The curved top surface of the wing is mainly responsible for pushing the air downward, so, to some extent, enhancing the camber (or curvature) of this surface can improve a plane's lift-to-drag ratio.

For any airplane's combination of weight, altitude, and speed, there is an ideal wing camber that delivers the required lift and also achieves the lowest drag. Much of the aerodynamic research figure out which camber adjustments would deliver the best performance under specific conditions. But the experts who carried out that theoretical work have had no means of implementing it on an actual plane until now.

Unlike wings with flaps, a flexible wing can smoothly adjust its camber to minimize drag during flight. In fact, a flexible wing could assume many more positions than a wing with a traditional flap, allowing for much finer control over the lift-to-drag ratio to match the evolving demands of a flight. If the flexible control surface fits smoothly against the rest of the wing, these adjustments would create no additional drag from protruding joints and hinges.

The upshot is that altering the wings' camber during flight allows aircraft designers to minimize drag depending on how much lift a plane needs for specific conditions. For example, the burning of fuel during flight diminishes the overall fuel weight, so the plane gradually requires less lift. Currently, pilots contend with this weight loss by reducing the aircraft's angle of attack, which is its angle relative to the oncoming flow of air. A flexible wing could simply morph the surface of its trailing edge continually throughout an entire flight to achieve the optimal camber for its current fuel weight.

The ability to fly well in a variety of flight conditions is important because aviation rules limit the speeds and altitudes at which airplanes can travel. In the United States, the Federal Aviation Administration, for example, reserves odd-numbered altitudes (such as 31,000 feet) for flights traveling north and east while south- and westbound flights stick to even-numbered levels. Invariably, planes wind up cruising at a combination of speed and altitude that is not aerodynamically optimal. But a flexible wing could be tailored to fly more efficiently at any assigned altitude or speed.

Aside from reducing drag, there is another potential benefit of shape-changing wings that passengers especially will appreciate. These wings can also dampen the shaking of the fuselage due to turbulence. This can be achieved by twisting the wings' trailing edges in just the right way so as to reduce the loads caused by turbulence and thus minimize the movement transmitted to the fuselage. This twisting would be done automatically by a sophisticated flight control system.

INDIAN AIRCRAFT TO UPGRADE AVIONIC SYSTEMS

All Indian aircraft's would have to upgrade their avionic systems soon to match with India's own satellite-based navigation system GAGAN.

If the airlines can take advantage of the GPS-aided Geo-Augmented Navigation (GAGAN) system by equipping their aircraft with matching avionics, almost USD 10 million worth of jet fuel could be saved annually.

Indicating the fact that a lot of fuel could be saved as the GAGAN system would help pilots navigate in all-weather conditions by an accuracy up to three meters. It would enable an aircraft to fly on a specific path between two three-dimensional defined points, straighten routes and reduce fuel burn. Such a capability would also help in landing an aircraft in tough weather and terrain.

Addressing an ASSOCHAM event, Civil Aviation Secretary Ashok Lavasa said "Virtually all aircraft to be equipped with GNSS (global navigation satellite system) avionics" in order to realize maximum benefits from the global navigation satellite system.

"With the proposed implementation of Indian indigenous regional network of satellites by India and with GAGAN becoming fully operational by the year end from en route to approach, the operators would be well-advised to embrace satellite based navigation considering its inherent benefits," Lavasa added.

Maintaining that India was poised to become the third largest market in terms of air traffic growth, he said satellite navigation technology was the vision of future and GAGAN was an essential cornerstone to future safety. The first phase of the ambitious navigation system GAGAN was certified by aviation regulator DGCA in January, which would be a major step to make it fully operational in the next few months.

DID YOU KNOW?

Travelling by air can shed up to 1.5 litres of water from the body during an average 3 hour flight.

AN INTERVIEW WITH A PIONEER

Mr. Krishna Kishore was the first batch student of Mechanical Engineering when KSIT was started. He has completed his Post Graduation in Energy Management. Currently he runs his own company named as "DRONE AERO SPACE SYSTEM", established in 2007.

How was your experience in KSIT?
It was a great experience to be a part of KSIT, I really enjoyed my college life in KSIT. I had started a musical band called as "Bhoomi".

Tell us something about your final year project.
I had done my final year project based on Aero. It was a new concept and first time ever done in history. I had made a mechanical bird called as "Flapping Wing Micro Air Vehicle". Basically, it was a bat around 1 foot and it used to fly by flapping its wings.

A Message to an entrepreneur.
It is easy to be an entrepreneur. You first need an idea and a new concept to be an entrepreneur. But the most challenging task is to sustain to be an entrepreneur. You should have clarity in your mind what you are putting into the market and what you are getting back from it.

Who is your role model and why? What is your success mantra?
No such person has been my role mode but there are many great personalities who have inspired me, Dr. A.P.J Abdul Kalam is one among them. Many start up motivates me like Sony, Google, Amazon, how they have started and spread across the world wide. My success mantra is my supportive family.

How do you see Automobile industries and Aerospace companies in global market?
Many Aerospace technologies are coming to Automobile industries and vice-versa because Aerospace technology mainly focuses on efficiency whereas automobile industries focus on cost and other things. Now, mature technology available in both the sectors. Both the companies have merged their technology and are able to give a better output.

What does your company work on and what challenges you have to face during making a drone?
Basically, my company work on flight control and navigation system of the drone and it is more about manufacturing and production of drone. One of the major challenge is that the drone should be a user friendly and it should be easy to be operate.

Your message for upcoming KSIT students.
If you are in position to break out of the box, try to do something new, by coming out of your comfort zone. Make your own path towards success. Always have higher vision in your Life.

Ms. Jhanavi BM, is a 2015 batch student who is currently working as a Designer Engineer, in the department of Underground Load and Haul at Sandvik Mining and Rock Technology.

How was your experience at KSIT?
The experience in KSIT is always worth cherishing. It had given me a platform to enrich myself with different experiences. Walking into the college totally clueless about engineering on first day and walking out of it holding "Best Outing Student" shield would sum up all of the things with which KSIT has gifted me.

How was your transition from student to a professional?
Transition period from a student to a professional was stupendous. Luckily we had got an opportunity to interact with business heads and they mentored us in our transition process. Initially we had few "Campus to Corporate" sessions, which made the process a cakewalk. Within a period of three months, we were moulded well as professionals.

What are the expectations from students in the industry?
The industry expects you to be strong with your fundamentals. They have a strong notion that, if you are good at your basics, then they can shape you according to their requirements. Soft-skills also play an important role. So it is better to equip yourself with your fundamentals and work on improving your soft-skills.

How did you go about finding a job?
I got my job through pool campus recruitment. The vacancies are limited but the students are more. Getting into the industry is very competitive for the freshers. Even if you start with a small job there is a lot of exposure. The initial years are challenging but once you are experienced, you'll have enormous opportunities.

Is it necessary to have a postgraduate degree?
In my personal opinion, opt for post-graduation only if you are interested in that particular field. It would be better if you take pursue post-graduation soon after you finish under-grad as you will be in touch with the subjects and if you put a little more effort you can clear competitive exams. Once you start working it is quite difficult to get back to studies.

Your final message to KSITians?
Follow your passion. Have a balanced mix of fun and work. Inculcate broader perspectives and put your heart and soul to whichever field you go to. Keep motivating yourself. Don't get too much stressed up with studies. Develop hobbies from which you can find your 'true self'.

AVIONICS COULD BE THE NEXT BIG THING IN INDIA: THOUGHT FOCUS

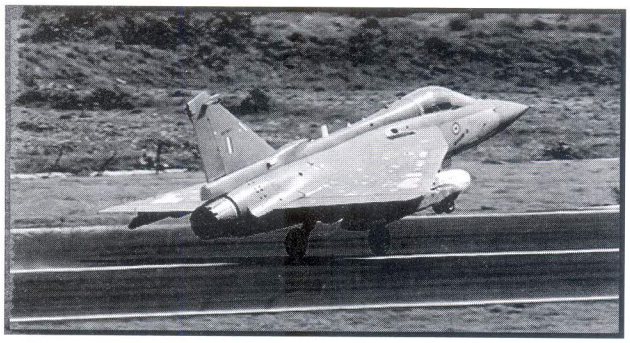
When US-based Thought Focus Technologies quietly bought aircraft component software maker Rayon Technologies last month, it highlighted the growing opportunity for Indian startups to make a mark in the lucrative avionics sector.

Cofounded in 2010 by Yogeeshachar BK, a former employee of AK Aerotek Software, the company had just three global customers but was highly profitable.

While the low number of clients indicates the difficulty startups have in breaking into the sector, it also shows business from them is much higher.

The fact that the deal was not reported in the media tells the story of the avionics space in India — a lot of action but very little talk.

Avionics, derived from a mish-mash of the words "aviation" and "electronics" , refers to any of the electronic systems inside an aircraft. The sector is becoming attractive as several multinationals outsource their work to India.



We had offers from other companies as well. It is a very small community," said 38-year-old Yogeeshachar, who also worked at BEL. "ThoughtFocus knew about us and made the best offer ." Rayon and ThoughtFocus declined to reveal financial details. "India was the top place where we could find talent," said ThoughtFocus' cofounder Shylesh Krishnan, 43.

Ten-year-old ThoughtFocus, funded by BlackStone private equity group, designs obstacle detection systems for helicopters and aircraft, including for Boeing and Airbus.

"The biggest advantage we (India) have is a strong software backbone in terms of design and testing of avionics equipment and comparatively lower cost of labour," said John Siddharth, a senior aerospace and defence analyst at research firm Marketsandmarkets , which estimated the size of the Indian market at $150 million (Rs 884 crore).

Setting up in avionics is not easy. It takes at least a year to develop a product and a few more to test it on systems that cost about $1-2 million (Rs 5-10 crore). Then there are several certifications that serve as obstacles to enter this capital intensive industry. Undeterred, young Indian entrepreneurs are lured by the vast opportunity and market.

'MAKE IN INDIA

In a bid to build an indigenous defense avionics industry, Hindustan Aeronautics Limited (HAL) and Bharat Electronics Limited (BEL) signed an MoU, to share their expertise in design, development, engineering and manufacturing of advanced airborne communication equipment.

The agreement sets to define the roles and responsibilities of both the PSUs for development of specific airborne communication equipment. Both organisations aim to pool their respective expertise in order to develop and produce avionics systems which have hitherto been imported by all branches of the armed forces.

HAL and BEL have agreed to share the business arising from the Indian defense services. "HAL has the expertise in design, development, engineering, manufacture of airborne communications equipment, whereas BEL has the expertise in design, development, engineering and manufacture of communications and secrecy products and solutions," the official statement said.

DID YOU KNOW?

LONGEST AIR ROUTES

EXISTING CHARTBUSTERS

AIR INDIA | Delhi-San Francisco (over Pacific) 15,300 km in **14.5hrs.** Delhi-San Francisco (over Atlantic) 13,900 km in **17hrs**
EMIRATES | Dubai-Auckland 14,120km. **17.25 hours**
QANTAS | Sydney-Dallas 13,725km. **17 hours**
UNITED | SFO-Singapore 13,515km. **16.5 hours**
DELTA | Atlanta-Johannesburg 13,500km. **16 hours**
ETIHAD | Abu Dhabi-LA 13,430km. **16.5 hours**

UPCOMING LONG HAULS

Qatar Airways Doha-Auckland in 2017 at 14,450km in about **17 hours**

Singapore Airlines **Singapore-New York** in 2018 at 16,500km. **19 hours**

LOCKHEED MARTIN

Air combat experts at Lockheed Martin Corp. are helping U.S. military researchers find sustainable ways of designing and upgrading aircraft combat avionics that will maintain U.S. air superiority in contested environments where pilots risk having their sensors and communications jammed or their aircraft shot down.

Officials of the U.S. Air Force Research Laboratory at Wright-Patterson Air Force Base, Ohio, awarded a $36.4 million contract late last month to the Lockheed Martin Aeronautics segment in Fort Worth, Texas, for phase 2 of the System of Systems Integration Technology and Experimentation (SoSITE) program.

The Air Force Research Lab awarded the contract on behalf of the U.S. Defense Advanced Research Projects Agency (DARPA) in Arlington, Va., which is sponsoring the SoSITE program. This initiative seeks to help U.S. combat aircraft designers overcome the problems of long aircraft design cycles and easy access of enemies to advanced technologies that mitigate the global air superiority that U.S. forces have maintained since the end of World War II.

The SoSITE program seeks to show that a system-of-systems (SoS) approach can help maintain U.S. air superiority in contested airspace with high risk of enemy electronic jamming, enemy fighters, and surface-to-air missiles. The program initially seeks to develop architectures for distributing functionality across networks of manned and unmanned aircraft for future experimentation, and to develop tools to enable this distribution to be done quickly and reliably.

In the SoSITE program's second phase, Lockheed Martin engineers will develop system of systems architectures to maintain U.S. air superiority in contested environments; demonstrate how a rapid-integration mission system can be integrated into architectures; and demonstrate the combat effectiveness and robustness of those architectures.

U.S. aircraft have enjoyed air supremacy in most areas of the world for a long time, but this era is coming to an end quickly, DARPA researchers say. Potential enemies have ready access to advanced technologies and can convert them to new military capabilities more quickly than the Pentagon can develop advanced weapons.

For decades the U.S. has built combat aircraft with not only advanced sensors and technologies that are inaccessible to potential enemies, but also that are expensive and time-consuming to design and build. Today, however, potential adversaries have broad access to advanced technologies, which makes the U.S. avionics design approach unsustainable, DARPA officials say.

To help solve this program, SoSITE will develop ways to integrate new U.S. technologies as they are developed to enable the military to remain ahead of the world in fielded capabilities.

The SoSITE project encompasses the integration of aircraft, weapons, sensors, and mission systems via the SoSITE Open-Systems Architecture (OSA). The SoSITE OSA is based on the Open Mission Aystems (OMS) -- an Air Force effort to develop interfaces between mission systems and services connected through an Avionics Service Bus (ASB). These interfaces use open and standardized interface definitions.

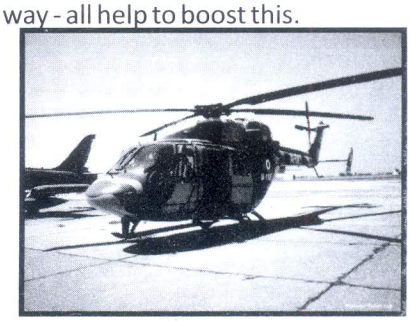
The first phase of the SoSITE had two thrusts: architecture development, which focuses on concepts for future distributed architectures; and integration technology development, which focuses on tools to integrate heterogeneous mission systems quickly onto different types of aircraft.

In addition to Lockheed Martin, the SoSITE program's first-phase contractors included Northrop Grumman Corp. in El Segundo, Calif.; and Rockwell Collins in Cedar Rapids, Iowa. In the program's second phase, Lockheed Martin experts will focus on resolving risks through experiments.

INDIAN AEROSPACE INDUSTRY OPENS UP

India is fast becoming a major global aerospace market, aided by a combination of increasing defense spending, a booming commercial aviation market, and rising technological and manufacturing capabilities among local companies.

Almost every major Western aerospace firm wants to establish a presence in the country that is one of the largest markets for both civil and military aircraft. Stringent offset requirements in fulfilment of those tenders, a government that is keen to create a manufacturing hub, and indigenous firms with greater freedom to set up partnerships and participate in the sector, and establish a niche in the global supply chain along the way - all help to boost this.



DHRUV (ALH)

The Helicopter Division of the government-owned Hindustan Aeronautics Limited (HAL) has developed the Dhruv (Pole Star) Advanced Light Helicopter (ALH), a light (5.5t class) multirole and multimission helicopter for army, air force, navy, coastguard and civil operations, for both utility and attack roles by day and night. The helicopter, which is built to FAR 29 specifications, entered series production in 2000.

18 Dhruv helicopters were delivered to Indian Defence Forces in 2000-2003 - eight to the army, three to the navy, four to the air force and three to the coast guard.

The army received its first three Dhruvs in March 2002. By June 2008, 76 helicopters had been delivered to the army and air force with 159 more on order. In February 2011, HAL handed over five Dhruv MK III advanced light helicopters to the Indian Army during the Aero India 2011 Air Show.

In June 2008, HAL received the **first export** order for the Dhruv - seven helicopters for the air force of Ecuador.

In August 2006, Indian Air Force and Coast Guard Dhruv helicopters were instrumental in rescue operations after devastating floods in India. Over 500 people were rescued. In February 2007, the Dhruv was qualified for high-altitude / low-temperature operations in Kashmir and Jammu.

In August 2007, maiden flights took place of the Dhruv powered by the new Shakti engine and of the weaponised variant of the helicopter. In September 2007, the Indian Army announced that the Dhruv was ready for deployment to the Siachen sector in the Himalayas.

The helicopter was deployed to the high-altitude airbase at Manasbal (Srinagar) and, in October 2007, a Dhruv helicopter flew at a record altitude of 27,500ft in Siachen.

The advanced technologies incorporated in the Dhruv design include Anti-Resonance Vibration Isolation System (ARI), Full Authority Digital Electronic Control (FADEC), hingeless main rotor, bearingless tail rotor, and an automatic flight control system.

Hindustan Aeronautics Limited and Israel Aircraft Industries have an agreement to market the Dhruv helicopter worldwide. IAI has developed an integrated helicopter avionics suite for the Dhruv, which includes day-and-night observation, electronic warfare suite, observation and targeting, and a flexible weapons carrying system

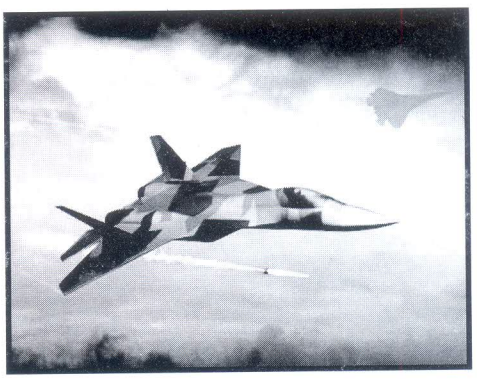
HAL ADVANCED MEDIUM COMBAT AIRCRAFT (AMCA)

The HAL Advanced Medium Combat Aircraft (AMCA) is an Indian Proposal for a fifth-generation fighter aircraft being developed and designed by India's Aeronautical Development Agency (ADA) and to be manufactured by Hindustan Aeronautics Limited (HAL).

The single seat, twin engine, stealth super-manoeuvrable all weather multirole fighter aircraft is designed for the air superiority, ground attack, bombing, intercepting and for other types of roles. It comprises the super cruise, stealth, AESA radar, manoeuvrability and advanced avionics to overcome and suppress previous generation fighter aircraft along with many ground and maritime defences.

SUKHOI/HAL FGFA FIFTH GENERATION FIGHTER AIRCRAFT

The Sukhoi/HAL Fifth Generation Fighter Aircraft (FGFA) or Perspective Multi-Role Fighter (PMF) is a fifth-Generation fighter being developed by India and Russia. It is basically the variant or derivative project from the PAK FA (T-50 is the prototype) being developed for the Indian Air Force. The PMF will include a total of 43 improvements over the T-50. There will be two separate prototypes to be developed, may be by Russia and a separate one by India. Russia's version is of single seat and India's version is of two seat.



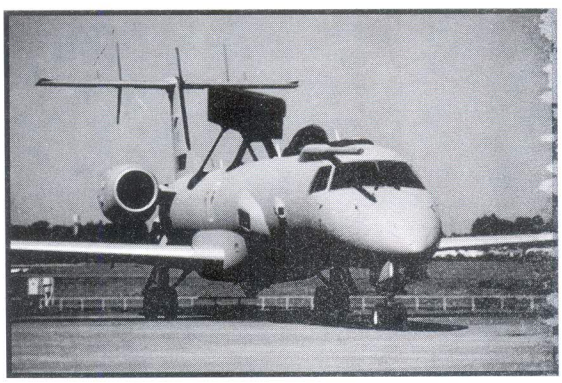
DID YOU KNOW?

The "Traub," the rarest motorcycle in the world was found in 1968, and still runs to this day.

DRDO AEW&CS – AIRBORNE EARLY WARNING AND CONTROL

The Airborne Early Warning and Control System (AEWACS) is a project of India's defence Research and Development Organisation to develop an airborne early warning and control system for the Indian Air Force. It is multisensory AEW&C system on a carrier jet being developed by DRDO in collaboration with Center for Airborne Systems (CAB) that provides an airborne surveillance system. It is the first native AEW system being developed by DRDO and CAB.

The DRDO AEW&C system is specially developed to serve IAF in detection and tracking, identification and classification of threats, guidance and interception control, display of air situation picture and multisensory data integration. It also helps the armed force to make communication with other aircrafts and with other AEW&C assets and also it allows for Search and Rescue operations, mission planning as well as record and replay for post mission analysis.



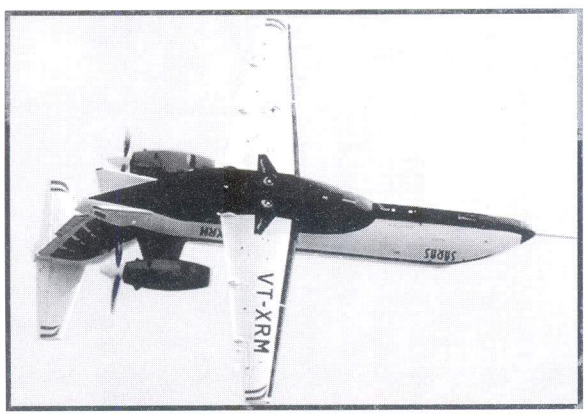
UAC/HAL IL-214 MULTIROLE TRANSPORT AIRCRAFT (MTA)

The UAC/HAL II-214 Multi-role Transport Aircraft (MTA) is a medium-airlift military Transport aircraft which is being developed as a joint venture of the United Aircraft Corporation (UAC) of Russia and Hindustan Aeronautics (HAL) of India. The companies are investing US$300 million each in the project.

The MTA is expected to replace the Indian Air Force 110 Antonov An-32 fleet of transport aircraft. The main objective to design the aircraft is to perform regular transport duties and also to deploy paratroopers. The aircraft is also used for parachuting of military personnel, equipment and cargo onto platforms and low altitude free-drop delivery of cargo. The aircraft is expected to take its first flight by 2017 and enters in IAF by 2018.

NAL SARAS LIGHT TRANSPORT AIRCRAFT (LTA)

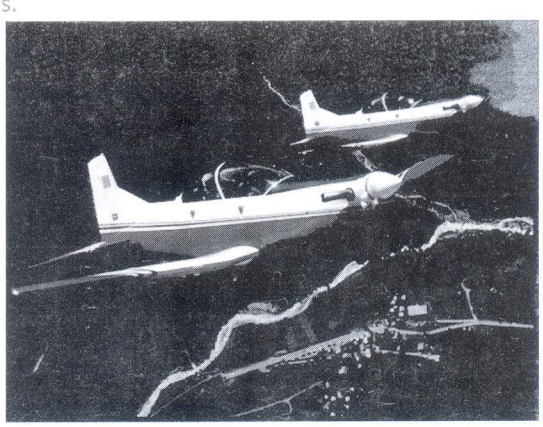
NAL Saras is an Indigenous twin-engine, multirole light transport aircraft being designed and developed jointly by Indian Companies National Aerospace Laboratories (NAL) and Hindustan Aeronautics limited (HAL) for the Indian Air Force. It is the first Indian multi-purpose civilian aircraft in the light transport aircraft category which is designed to execute passenger and freight transport, remote sensing, flight training, aerial surveillance, coastal surveillance, border patrolling and medical evacuation missions. It was designed adhering to the FAR-25/23 standard regulations and can offer air taxi and commuter services. The aircraft will feature a conventional all metallic fuselage and carbon fibre composite (CFC) wings. The cabin is being built to flexibly suit commuter, executive with luxury seats, executive with deluxe seats, ambulance and combat versions.



HAL (HINDUSTAN TURBO TRAINER)HTT-40 TRAINER AIRCRAFT

The Hindustan Turbo Trainer-40 aircraft project is a Hindustan Aeronautics Limited (HAL) proposal for an indigenous replacement for the Indian Air Force's retired HPT-32 Deepak as a basic trainer.

The aircraft is in under development. The unit cost of the aircraft is $6.5 million. It is being designed for the IAF to perform Basic flying training, Aerobatics, Instrument Flying, Navigation, Night flying and Close formation. The HTT-40 is a far superior aircraft and can deliver 40 hours of flying for the same cost an F-16 or MiG-29 will deliver in just one hour that's why the plane gets the number in its name. HAL is expected to build 116 aircrafts.



CAREER IN AERONAUTICS

The aerospace industry provides a number of career options for engineers, scientists and technicians upstream to other downstream business management roles, whereby you can pick a job role matching your area of interest.

The job profiles which are commonly offered to the aeronautical engineers are as follows: Aerospace Design Checker, Aircraft Engineers, Aircraft Production Manager, Thermal Design Engineer, Research & development.

Those interested in R&D can design a satellite launcher, test the latest environment-friendly turbine or create the latest fighter plane as part of the production team. One may also consider joining the human resources team of a large aerospace manufacturer to develop strategies for attracting, recruiting and retaining skilled employees.

During the design process of an aircraft, the aerodynamicist works with other design engineers to make sure that the airplane moves easily through the air. The design engineer, on the other hand, decides how long a plane has to be to hold a certain number of people, how wide it should be, where the wings need to be and how strong the materials should be.

SCOPE AND OPPORTUNITIES

Jobs are available with the national, international, public and private Airline Services as well as aircraft-manufacturing units. One can also explore opportunities with various airlines like: Air India, Helicopter Corporation of India and flying clubs, private airlines and government owned air service and aircraft manufacturers like Hindustan Aeronautics Ltd. (HAL) with its factories at Bangalore, Nasik, Koraput, Kanpur etc. Defence Research and Development Laboratories, National Aeronautical Lab (NAL), Aeronautical Development Establishment and Civil Aviation Department.

Initially, candidates begin to work as graduate engineer trainees or junior Engineers. Keeping in view their performance, academic background and aptitude, they are placed for training in the aircraft maintenance/overhaul or support section.

On completion of training they are placed as assistant aircraft engineers or assistant technical officers. They have to clear departmental examinations for further promotions. They may advance to administrative or executive positions or become consultants.

Engineers are assisted by aircraft mechanics in maintenance of aircraft frame, engine, electrical system and other ancillary fittings. To sum it up, companies, while recruiting, look at the combination of a consistent academic record, deep understanding of the subject matter and good communication skills. According to Confederation of India Industry (CII), India's Aircraft MRO segment (Maintenance, Repair and Overhaul) is estimated to grow at 10% and reach USD 2.6 billion by 2020.

NEXT EDITION

ADVANCEMENT IN AUTOMOBILE ENGINEERING

A **Monowheel** is a one-wheeled single-track vehicle similar to a unicycle. However, instead of sitting above the wheel, the rider sits either within it or next to it. The wheel is a ring, usually driven by smaller wheels pressing against its inner rim. Most are single-passenger vehicles, though multi-passenger models have been built.

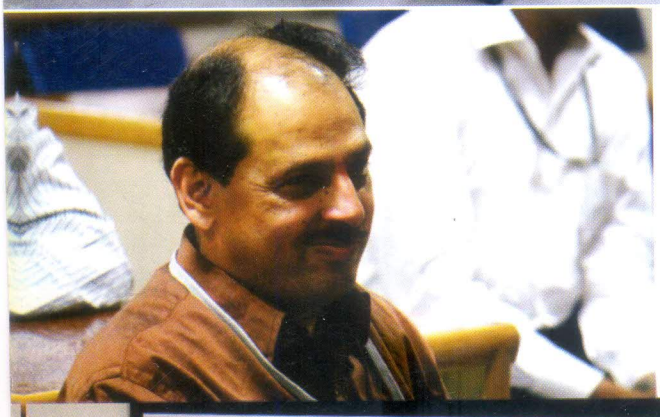
Hand-cranked and pedal-powered Monowheels were patentedand built in the late 19th century; most built in the 20th century have been motorized. Some modern builders refer to these vehicles as **MONOCYCLES**, though that term is also sometimes used to describe motorized unicycles.

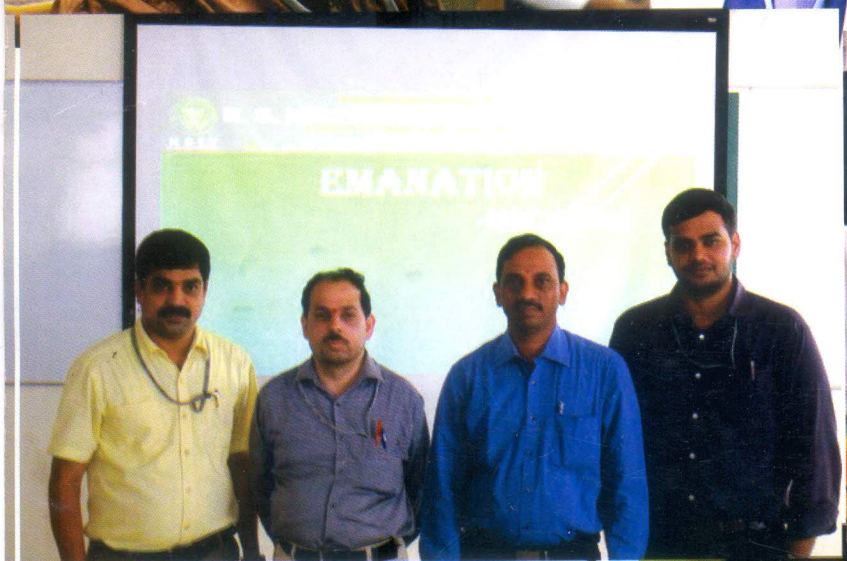
Today, monowheels are generally built and used for fun and entertainment purposes, though from the 1860s through to the 1930s, they were proposed for use as serious transportation.

The world speed record for a motorized Monowheel is 98.464 km/h (61.18 mph).

Many more new concepts...


National Conference 2017

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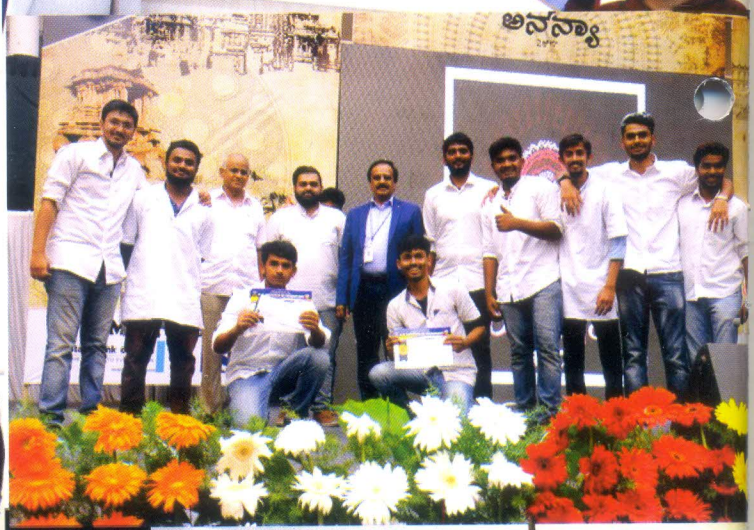
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