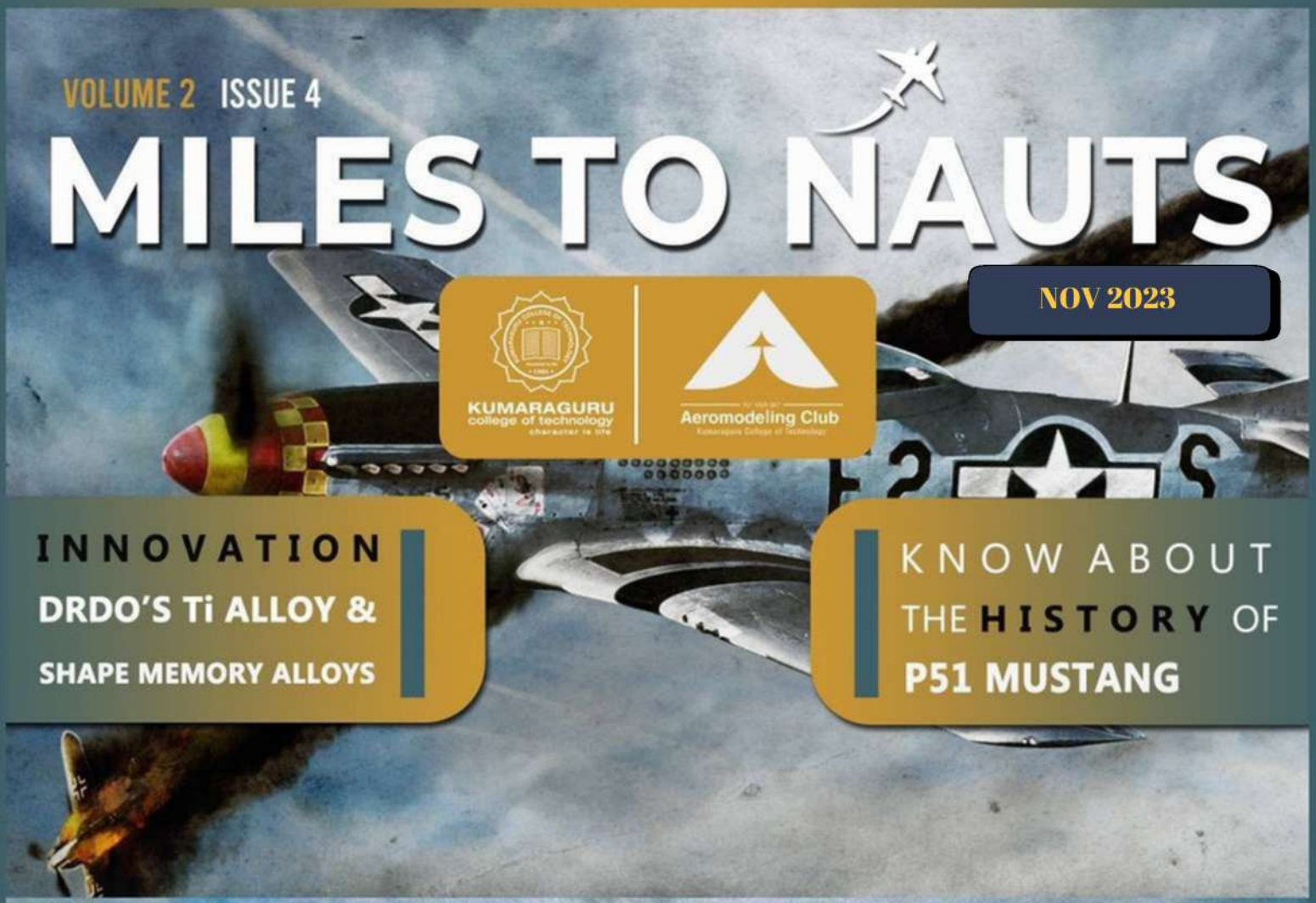
VOLUME 2 ISSUE 4

MILES TO NAUTS

NOV 2023

KUMARAGURU college of technology
character to life

Aeromodeling Club
Kumaraguru College of Technology



INNOVATION
DRDO'S Ti ALLOY &
SHAPE MEMORY ALLOYS

KNOW ABOUT THE HISTORY OF P51 MUSTANG

AEROSPACE START UPS
AERO 360

LIFE AND SCIENCE
BUOYANCY
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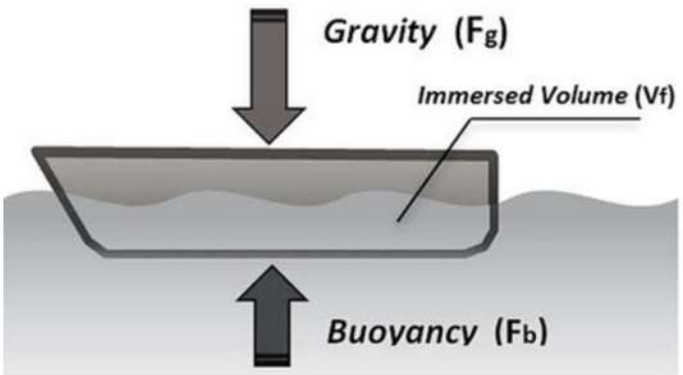


EDITOR'S NOTE

Ms. Fousana Dilshad

UG First Year,Department of Aeronautical Engineering

Dear Readers,

I'm very much delighted and privileged to have made our magazine, "MILES TO NAUTS", reach your hands. Me and every single member of my team have worked hard and at the same time witnessed some extraordinary experiences while putting this magazine together.

Our magazine is the brainchild of students who are so passionate about aerospace and dream to create a niche for themselves in this challenging yet fascinating field. The magazine aspires to create a connection between what individuals study and what they practice.

In this issue, we have put together facts, experiences, and information that will definitely benefit anyone who flips the pages. The magazine aims at quenching the intellectual thirst of anyone who is trying to constantly educate themselves and to motivate them to strive toward excellence.

We hope and believe that you would be as thrilled and excited as we were while working on this magazine and constantly render your support through your constructive criticisms and continued readership.

Hope to see you soon,
Fousana Dilshad, Editor.

HISTORY OF AVIATION

MUSTANG

During World War II, a design team headed by James Kindelberger of North American Aviation (NAA) designed Mustang in April 1940. P-51 Mustang is a long-range, single-seat fighter-bomber. Purchasing Commission of the Royal Air Force (RAF), approached the North American Aviation(NAA) to license build the Curtiss P-40. But, North American Aviation proceeded with the design and production of a more modern fighter instead of reusing old design from another company.

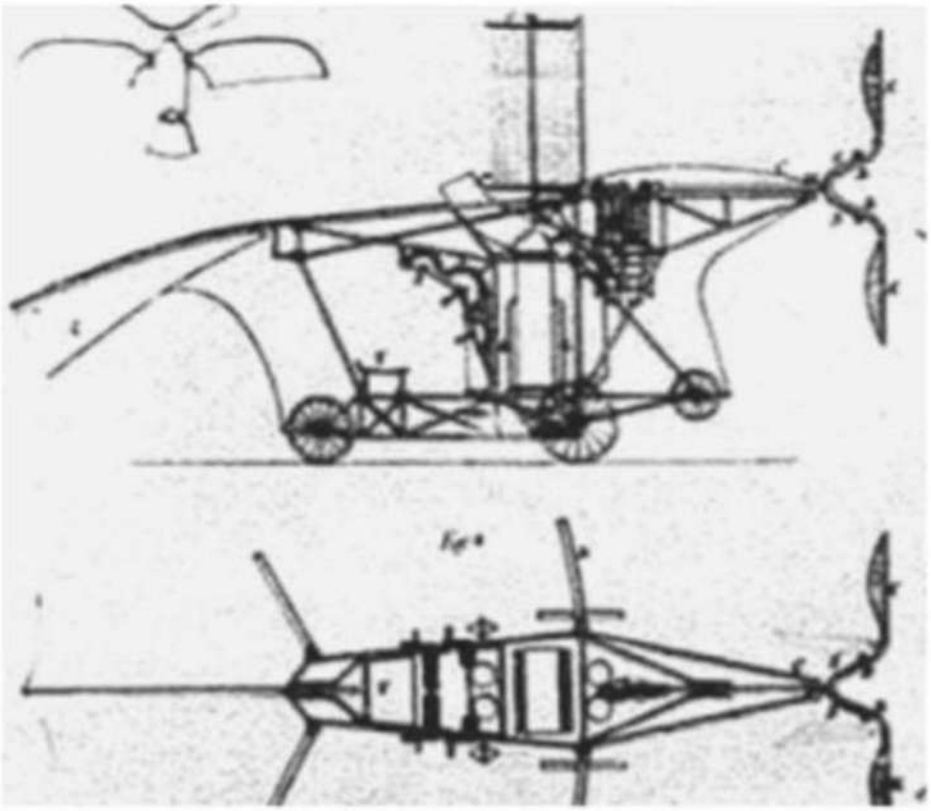
North American P-51 Mustang

P-51D of 375th Fighter Squadron with underwing drop tanks

The Mustang used the Allison V-1710 engine where performances in high-altitude were limited in previous versions. So, Allison was replaced by Rolls-Royce Merlin, leading to the P-51B/C (Mustang Mk III) model. This engine replacement transformed the performance above 15,000 ft altitude, helping Mustang Mk III to compete with the Luftwaffe's fighters. The conclusive version, the P-51D, was equipped with six .50 caliber (12.7 mm) AN/M2 Browning machine guns. A license-built version of the two-speed, two-stage-supercharged Merlin 66 called Packard V-1650-7 powered this aircraft. From late 1943, these Merlin-powered Mustangs were used by the RAF's Second Tactical Air Force and the United States Army Air Force's Ninth Air Force as fighter-bombers. Envying Mustang ensured Allied air superiority in 1944. Allied air forces in and around the Mediterranean, Pacific, Italian and North African made use of this P-51. Mustang pilots claimed to have destroyed 4,950 enemy aircraft in World War II.

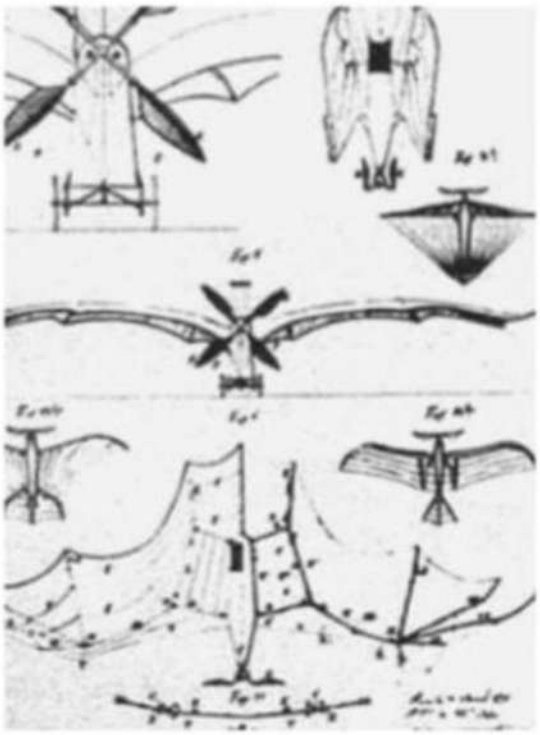
EARLY POWERED HOPS

In 1886, Frenchman Clement Ader constructed his first of three flying machines, named "Éole" also called Avion. Just as given in the patent drawing, the wing was designed 'bat-like'. The power plant was a self-invented lightweight, steam engine (4 kg/kW), with four cylinders developing 20 horsepower (15 kW) that drives a four-blade propeller. The wings spanned over 14 m and the whole aircraft weighed about 300 kg.



Ader Éole-French aircraft

On 9 October 1890, Ader made a flight attempt. A powered take-off and an uncontrolled hop of approximately 50 m and 200 mm height was credited to his efforts by the aviation historians. Of the three, the successive two machines were not reported to have achieved flightThen came the Wright brother's flights in 1903.



Ader Éole-French aircraft

Fédération Aéronautique Internationale (FAI) which was known to set standards and keep records for aeronautics considered these flights as "the first sustained and controlled heavier-than-air powered flight". Fully controllable and stable flight that lasted significant time period was achieved with the Wright Flyer III by 1905.

FACTS

Jehangir Ratanji Dadabhoy (JRD) Tata is known as the Father of Indian Aviation

ICON OF THE MONTH

UDUPI RAO

Rightly regarded as the Satellite Man of India, Udupi Ramachandra Rao's exploits in the field of space are outstanding. He was born on the 10th of March,1932 in the Madras presidency of British India. He completed his higher education at various institutions including the Banaras Hindu University and the Madras University.

HIS SCIENTIFIC CAREER

He started his career under Dr.Sarabhai who was working on cosmic rays. Rao being the dedicated explorer he is, delved even more into the topic after reaching the States. He became the first to prove the continuous state of the solar wind by observing Mariner 2. His works in the Pioneer and Explorer spacecraft are commendable. He returned to India in 1966 as a professor at the Physics Research Laboratory, Ahmedabad, and the Chairman of the Indian Institute of Space Technology, Thiruvananthapuram in 1984. He was also the President of the Indian Centre for Space Physics. He took up the huge responsibility of establishing space technology in India and played a crucial role in the launching of India's first satellite (Aryabhata) in 1975, after which he helped with designing and fabrication of many satellites including Bhaskara, Rohini, INSAT-1, INSAT-2, etc for purposes ranging from communication to remote sensing to meteorological services. During his time as the Chairman of ISRO, he contributed to the development of the Augmented Satellite Launch Vehicle (ASLV) rocket. He also initiated the building of the Geostationary Launch Vehicle (GSLV) and the Polar Satellite Launch Vehicle (PSLV) making it the first Indian rocket to be equipped with liquid stages. He was also the first to research cryogenic technology after a lag in Russia's cryogenic supply to India. He was appointed as the chairman of the United Nations - Committee on Peaceful Uses of Outer Space (UN – COPUOS) in 1997. Rao also held the seat of the Vice president of the International Astronautical Federation from 1986 to 1992. He has also published three books titled "Perspectives in Communication", "Space and Agenda 21 – Caring for Planet Earth" and "Space Technology for Sustainable Development" which have become bestsellers over the course of time.

AWARDS AND ACCOLADES

On the national front, he received two of the highest awards possible. He received the Padma Bhushan in 1976 and the Padma Vibhushan in 2017. He was also given the lifetime achievement award by the distinguished president, Dr.A.P.J. Abdul Kalam, the Shanti Swarup Bhatnagar Award from Prime Minister Jawaharlal Nehru and the Electronics Man of the Year award by ELCINA in 1994.
On the international front, he was awarded the Yuri Gagarin medal in 1991, the Vikram Sarabhai medal of COSPAR, and the Theodore Von Karman award from the International Academy of Astronautics. Apart from all these, he had received about 40 other prestigious awards from various national and international organizations. He was inducted into the Satellite Hall of Fame in 2013 and the Hall of Fame in 2016, making him the first and only Indian to achieve both of these feats to date.

LEGACY

He died on the 24th of July 2017. Working for the world of space science till his last breath, Rao is nothing less than a legendary inspiration. As the famous google doodle for his 89th birthday said, his stellar technological advancements continues to be felt across the galaxy.

FACTS

The world's largest passenger plane is the Airbus A38. It is a double-decker four-engine jetliner.

INNOVATION IN AVIATION

DRDO TITANIUM ALLOY

Defense Research and Development Organization (DRDO) has announced the development of high strength metastable beta titanium alloy and this will be produced on an industrial scale for making aerospace structural forgings. A Hyderabad-based Defense Metallurgical Research Laboratory with specified role as to develop and produce metals, alloys, ceramics, and their composites for advanced uses, like in aerostructures has taken up the production. It has been announced that the new alloy (titanium alloyed with aluminum, iron, and vanadium) has a feature of very high strength-to-weight ratio.

Finished Machined and Anodized Droplink

Tejas: Titanium to replace 15 steel components

Some of the countries use these types of alloys like iron alloyed with nickel, chromium, and molybdenum to make very complicated aerospace structures. These alloys are much heavier than titanium alloy.

"The high-strength beta titanium alloys are unique for their features like higher strength, ductility, fatigue, and fracture toughness which makes them highly attractive for aircraft structural applications. Moreover, their relatively lower lifetime cost and superior corrosion resistance in comparison to steels, is an efficient trade-off to justify the utilization of this expensive material in India," stated the Ministry of Defense.

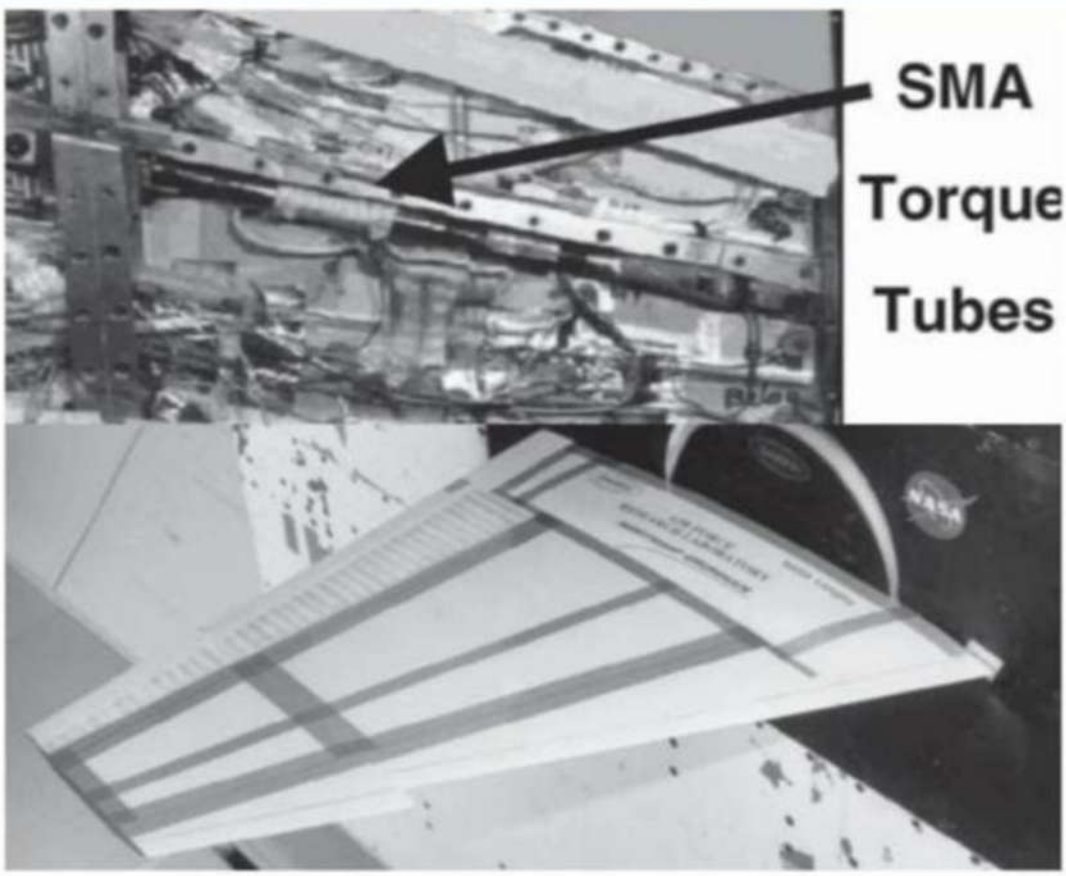
Slat/flap tracks, landing gear, etc. are some of the components which can be forged from this alloy.

SHAPE MEMORY ALLOY

A shape-memory alloy (SMA) is an alloy that when deformed in a cold state returns to its original or remembered shape upon heating. These unique materials are also called memory metal, smart alloy, or muscle wires. They are frequently made of compositions of different metals such as nickel, titanium, copper, or aluminum. Nowadays, the Nickel-Titanium alloys are the most commonly used shape memory alloys.

SMAs haven't been successfully employed in critical aircraft actuation owing to several technological and infrastructure challenges. They have demonstrated some prototypes but other critical elements such as material form, certification, and other crucial design tools have not progressed with the equivalent level of maturity. The shortcomings of these alloys are acknowledged and are built on previous successes to accelerate SMAs a step closer to aircraft adoption.

Newer applications that make use of these advancements are the Spanwise Adaptive Wing (SAW) project and structure Remote Control Actuation (RCA). NiTiHf alloys with suitable actuation temperatures and availability in commercially useful forms found it's use in the SAW project. Second, the RCA project represents a subsequent paradigm shift in structure testing. It employs NiTi torque tubes capable of moving and controlling the model parts, enabling increased productivity, improved data quality, and reduced cost of wind tunnel testing.



SMA torque tube as installed in the model wing

APPLICATIONS

- The US has been using SMAs in spacecraft antennas and aircraft mechanisms very early. The major usage of SMAs has been administered in sealing connections mechanism, deformation of the engine nozzle, the research of wing deformation and the tight sealing of cabin doors, etc.

- Wing morphing in planes use SMAs to get required specifications. Some of the benefits reported are increased speed, reduced power consumption, roll control, and camber change.

SMA in Aircraft engine nozzle

FACTS

The world's fastest airplane is the Lockheed SR-71 Blackbird, flying at 2,193 miles per hour.

INTERVIEW

DR. SHANKAR CHELLARAM

Mr. Shankar Chellaram is a commerce graduate and holds a Masters in Science in Defense and also in Business Administration(Finance). For 21 years, he worked in accounts branch of Indian Air Force and was the trusted financial advisor on effective utilization of public and non-public funds. Then he worked 21 years in private sector and has been teaching softskills and management subjects in various cities of UAE. He is extremely passionate about motivating youngsters and teaching them soft skills and life skills, like public speaking, work life balance, career counselling, emotional intelligence, Financial planning etc.

1. We got to know about the turning point of your life when you got your permanent commission in the accounts branch of the Indian Air Force. Can you share with us your experience on that day? What struggles you had on your way to reaching that position?

Joining the Indian Air force, the date of permanent commission, 8th June 1978, was a red-letter day in my lifetime. It's a matter of honor and pride to serve the Indian Air force, as you become a representative of the nation. Being in uniform is something that made not only me feel good but also my parents, friends, and well-wishers. 52 weeks of training in Air Force Academy, Dundigal, Hyderabad, was a unique experience, where we were introduced to both theory and practice, arms drill, sports activities, morning health runs, evening games apart from studies like Hindi, war studies, man management, leadership, communication. In those 52 weeks, they gruel you, and they make a man out of you. Otherwise, you would have a boyish personality. Now you have finally become a soldier and then to officer where you develop all the officer-like qualities.

2. How did you choose your path after your studies? Do you think going the way life takes you is good, or we should pre-determine our destination?

Human beings are known to be the crown of creation. The reason is, we all have a choice. You have a choice of action, in other words, like someone beautifully said, "you can make a heaven out of hell and hell out of heaven." Therefore, there is no such thing as destiny. You decide every moment what you want to do in life, whether you choose to do good or the opposite.

Human beings are known to be the crown of creation. The reason is, we all have a choice. You have a choice of action, in other words, like someone beautifully said, "you can make a heaven out of hell and hell out of heaven." Therefore, there is no such thing as destiny. You decide every moment what you want to do in life, whether you choose to do good or the opposite. Every moment you can decide, whether you want to grow and evolve or revolve or devolve or dissolve. The choice is yours. Ultimately, what is important is that you have multiple choices, but you must choose whatever you feel makes sense and which will enrich you and make you grow. That's very important.

3. You have spent 21 years in the IAF and 21 years in the private sector. Which one do you prefer, sir?

You could never compare. You can compare an orange with an orange. You can't compare an orange with an apple. Defense services teach you a lot of good things. The most important thing in the defense services is they teach you discipline. Unfortunately, in the civil Street, you will notice that the discipline is lacking. People come late and you are taken for granted. In defense services, you can't afford to come late. You have to be 10 minutes earlier.

There is something called greetings. The juniors have to greet the seniors. If a lady enters whatever may be the seniority, the chief will stand up and wish. These are the courtesy, the etiquette, and the discipline which is never taught anywhere in the civil sector. But it is taught as training in defense services.

Coming in time, looking after your body, that is exercise. Plus, you have to be mentally alert, intellectually strong and they give time for silence also. You become an integrated personality when you join the defense forces. The civil side has its charm. I can't say civil is bad. You can't compare. For example, when I joined the civil side, I had the privilege of teaching MBA students. Teaching MBA students is a joy by itself because I love teaching. Even in the defense services, I was doing a lot of training programs. The Defense Service College, Wellington or the Air Force Administrative College, Coimbatore, and also, I was in the Defense College of Management, Hyderabad. There is a lot of exposure. In the defense services, one more good thing you have is, there is a lot of opportunities to enjoy. That means you have a lot of parties, you have fun, you have camaraderie and you laugh a lot; there is so much of humor, there is so much of social networking; people go out of the way to help each other.

On the day when I was going on temporary duty, my commanding officer and his wife came to look up my wife and to find out if everything was all right, if she needed anything. That caring and sharing attitude I found much more in the defense services. There's a small group, a networking group you know. In civil I didn't find that. But civil has its own charm. So, both cannot be really compared.

4. What is that one special quality which you have, which gave you a long run in your career?

The one quality which I was reflecting on is effective communication. Effective communication is important in life, that it is actually a life skill. The most important dimension of communication is the art of expressing your ideas and thoughts with another person or another group. And the simplest definition of communication is the meeting of minds. Because you must have noticed there are a lot of communication gapsand misunderstandings. And a very important ingredient of communication is the skill of active listening, that you have to keep your mouth shut. So basically, what I found is, God has given me a gift to speak effectively and articulate my thought process.I got the first prize for public speaking in the Air Force Administrative College.

That is one dimension or quality which I feel has helped me, even my teaching for MBA students. Because I was able to effectively communicate, they selected me.

5. You have spent almost 14 years in teaching MBA in various places. Is there any particular reason which made you take teaching as a profession?

The best part about a teacher is, he is twice learnt. Most of the MBA students were managers or assistant managers when I was teaching in Dubai. I had to address the best student there. That means I had to prepare myself. I can't go and teach unless I can engage and communicate with the whole group. Also, I should be a notch above, or a couple of notches above the best student. Therefore, I had to prepare myself. To prepare you have to learn, you have to study, you have to give examples and mini case studies. And then it was not a one-way traffic. I used to engage the students and encourage them to ask questions. When they used to ask questions from their experience, you learn over again.So teaching is probably the only profession with a platform to learn at least two times, or maybe more than that; Once during preparation, once after presentation, where the students ask some profound questions. When those questions come up, then you realize that this is a noble profession. And you can transform the life of a student.

6. Not only MBA, you have also been teaching and training people on various softskills. Even though it adds to the teaching side, it's a unique profession which many people don't take. What made you pick this profession and train people on the peculiar side of softskills?

In my school and college, nobody taught me softskills. You must understand that softskills are very important. They are very crucial and they have tremendous benefits. For example, I was surprised when I came to know that 92% of talent acquisition professionals reported that softskills are more important or equally important for them to hire than hardskills. This is the finding of LinkedIn's global talent trend report. The HR believes that it is difficult to find candidates with right softskills. You will find a person, an engineer who's qualified but when you ask him to talk, he is not able to articulate and express. It's not his fault, because the system in schools and college have no focus on softskills.It is found that a person with good softskills will ensure a better relationship, enhance productivity and there are lesser misunderstandings. Their presentation skills go up and they have lesser conflict and stronger leadership. Softskills are transferable across industries and positions, like EQ (emotional intelligence). I was not exposed to softskills. Therefore, I decided, "Okay, let me do my bit and let me share the softskills with students whom I am exposed to". I used to conduct many programs called, for example, 'listen to listening', 'dynamics of creativity', 'everybody gets angry'. Human beings are prone to anger. So, why not we talk about anger management? Therefore, these subjects are very important. Softskills, they become life skills. There is problem solving and going to the root cause of the problem. Unless you get to the root of the problem, you can't solve it.

Hardskills are important but softskills are more important. Take for example a husband- and -wife relationship, the conflicts take place basically because people are not exposed to softskills. If both husband and wife will listen to each other more than talk, most of the problems will be solved. Now the combination of personality traits behaviors and social attitudes facilitate enhanced communication. Softskills is all about people skills and social skills, how to get along well with people.

People are different yet we expect people to behave in the way we want them to behave. That doesn't work. Every college should have softskills training at least once in a week. They should invite guest lecturers and people with very good personalities who can articulate very well. I am a proponent of softskills. Therefore, I'm spreading the word around wherever I can.

7. There are a lot of softskills like communication, teamwork, problem solving, time management, etc. These are most known softskills. But other than these, there might be few unnoticed yet crucial skills needed by students or any professionals for that matter to have a long run on their career. What are they?

It a good question and this is very important. There is a softskill called PMA which I conduct, a PDP (Personality Development Program). Now what is the definition of personality? Many people think its only the external part. Suppose if you dress up well, it builds up your personality. No, it's not like that. To say what's personality, I'll give a simple example. Take a table with four legs. So, you have to look after your appearance, that's the physical part. You have to look after your body, do exercises, etc. Second is the emotional part. You have to build your emotional muscles. If somebody, let's say, abuses you, and then you start crying and crying for three days, it means you are emotionally weak.

The third is intellect. You have to build your intellect the way you build your muscles. There are techniques to build your intellect. And fourth is spending time in silence. Everyday one must spend at least 5 to 10 minutes in prayer or silence, whatever you call it. So, I sum up by saying that integrated personality has physical ability, emotional maturity, intellectual clarity and spiritual sublimity. This is one of the skills which is very important. It covers the complete personality of a human being. These are 4 important dimensions of a human personality one must build. What about being creative? We are so used to doing the mundane work but how about being creative. For example, we are talking to each other because somebody has been creative and came out with this type of facility. What about WhatsApp, the wheel, they were all the results of being creative. Then comes public speaking. Let's say you become an entrepreneur. You want to speak to your staff and what type of a boss you will be if you can't speak to your staff members? What about teamwork, group dynamics, change. I was in Dubai and I remember a very nice thing about Sheikh Mohammed there and he said "You must expect change. Change is the reality of life. So, we need to understand what is change and what is organization development. What about collaboration, teamwork, negotiation and conflict resolution. So, these are the life skills and softskills. Even though there are many programs, one must know that there are programs like this and learn something very nice everyday about softskills. Yes, hardskills are important. Hardskills will help you get a livelihood. But, softskills will help you build your life.

8. There is a new trend of visiting new places, travelling and touring when we feel stressed or depressed about the next phase of life. How do you see this?

Luckily for me, being in the defense services, we are used to travelling and we loved and looked forward to travel. For example, my first posting was in Ambala, after six months, they told me to move to Amritsar. My wife and children were mentally prepared. They get excited when the posting order comes. We do the packing and then the unpacking. From Amritsar I came to Avadi, Chennai. From Avadi, I went to Wellington and from there I went to Pune. From there, I went to Jammu and Kashmir, went to Srinagar. So, travelling becomes so important and so useful because you learn a lot of things. Travelling is one of the best forms of education.

One is, you see different places, different people, different climate, different culture, different cuisine. I mean Guajarati and Marvadi and whatnot. I'll give you one interesting example when I was in Jodhpur, I left my scooter. My wife, by mistake, left her purse. After one hour we came back, the scooter and the purse, everything remained intact. Honest people, nobody touched the purse. Every place has got its beauty and you must travel to experience them. I went to Singapore and was so surprised to see that every house has green plants. I mean the place is so beautiful, so neat and clean that you start envying the place. India is such a great country but you see the civic sense, the way people, in spite of the Abhiyan (the cleanliness camping) the Prime Minister has conducted, the civic sense is so poor, it so sad. I think only the student community can do something, get the NGOs involved and teach others. It should be everyone's responsibility to keep things clean. When you travel, you learn a lot. I was in Dubai and its an amazing place. It's a desert and you find gardens, you see fountains. In the middle of the night, you see sweepers sweeping the streets. The street which is already clean is again being swept. Early morning you see the streets being watered.

So, these are the good things you can learn, you can learn the best practices from other places only when you travel, when you are observant, objective and scientific. Travel is very important for a person to build his/her personality.

9. What is your answer to the students who ask you 'how to enter the IAF'?

The answer is simple. In today's context, unlike in the earlier days, if you just go to Google and type 'joining the Indian Air Force', you'll get the Indian Air Force link. Now what you need to do is you need to study that website, not once, not twice, but three times at least. Then find out the qualification, where you want to join, and whether you meet the minimum requirements like age. For example, if you want to become a pilot, your eyesight has to be 6/6. In the Air Force broadly there are two branches, the flying branch and the ground duty. In the flying branch, they have three dimensions, fighter pilot, transport pilot, and helicopters. On the ground duty, you have administration, logistics, accounts, and technical. In technical you have aeronautical, electrical. And you have the education and the medical branch. This is broad. And the good news now is they have already started inducting women. Earlier, women were not being inducted in the flying branch. So, joining IAF is based on your qualification, skill set, temperament and your interest. If you love flying, you have to have a science background. If you did B. Com, you can't go into flying. I did my B. Com and I went into the accounts branch. If you are an engineer, you can go into the technical branch. Everything is given on the website. Then you have a PRO (Public Relations Officer).

You can call up or send an email and they'll give guidance. That is how I would recommend it. You should not hurry up. You should study, research, and be convinced that you want to join. One more important thing you must understand is, in the defense services, highly intelligent people are not required. Why because they start questioning. If they tell you to shoot, you better shoot. You can't ask why. Therefore, asking too many questions is not recommended and it is not desirable. Such people should join some other area. Or if you want a happy-go-lucky life, the timings will be from 7:30 to 1:30. After that you take a rest. Then you have to play volleyball, go swimming. If there is a party, you have to attend. Ladies are invited and the officers have to attend. There is a decorum. You can travel, you can get into adventures. So many good things are there.

The private sector may offer higher earnings than the defense sector, but the charm of defense services is unparalleled. With recent improvements in pay structures, defense personnel enjoy numerous benefits, including free rations, canteen facilities, annual air and train travel allowances, 60 days of annual leave, 20 days of casual leave, and additional sick leave. Life in the defense forces is not just rewarding for the officers but also for their families, particularly their spouses, who experience a unique and fulfilling lifestyle.

Throughout this interview, I have noticed you frequently quoting authors and their sayings, highlighting your deep connection with books. Could you share your most recommended books that everyone should read at least once in their lifetime and a favorite quote that has inspired you?

I would recommend two books. The first is Kindle Life by Swami Chinmayananda, which has profoundly inspired and benefited me. It offers valuable insights on how to live life intelligently and cultivate essential life skills. The second is Success Principles by Jack Canfield, a book I strongly recommend to my students. The wisdom gained from reading this book is equivalent to six months of college exposure, making it an invaluable resource for personal and professional growth.

As for a quote, I deeply resonate with: "Calmer the mind, sharper the intellect." If your mind is disturbed, making sensible decisions becomes difficult. Decisions made in anger can be harmful and dangerous. Achieving a calm and balanced mind requires effort—understanding, reading, and reflection. Especially in today's world, filled with competing demands, challenges, and conflicts, one must strive to maintain balance. I hope students embrace this principle in its true spirit.

FACT: Only about 25% of first-class passengers pay the full fare. The remaining seats are occupied by upgrades, frequent flyers, and airline employees.

4o

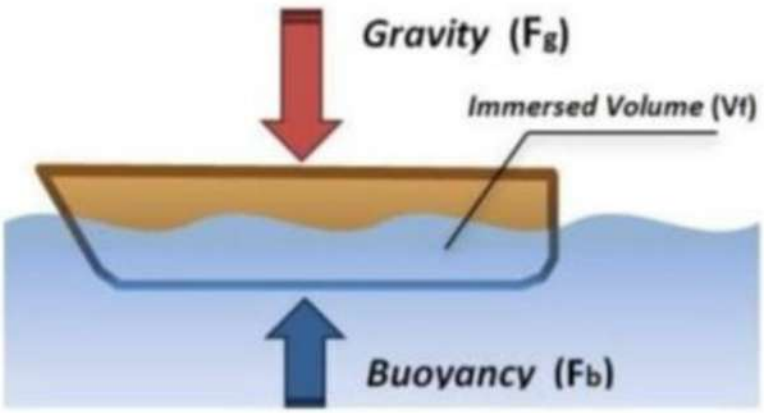
LIFE AND SCIENCE

Some of us thought that only wooden boats were able to float. If the boat is made up of another metal like steel, then the boat will sink into the water. But this was a wrong conception. Let's understand what's the concept behind floating.
The exact reason is due to the phenomenon of generating the upward force which is commonly known as "Buoyancy"

Buoyancy is simply the ability of the objects to float in a fluid.

To understand the physics behind this concept, let's take an example.

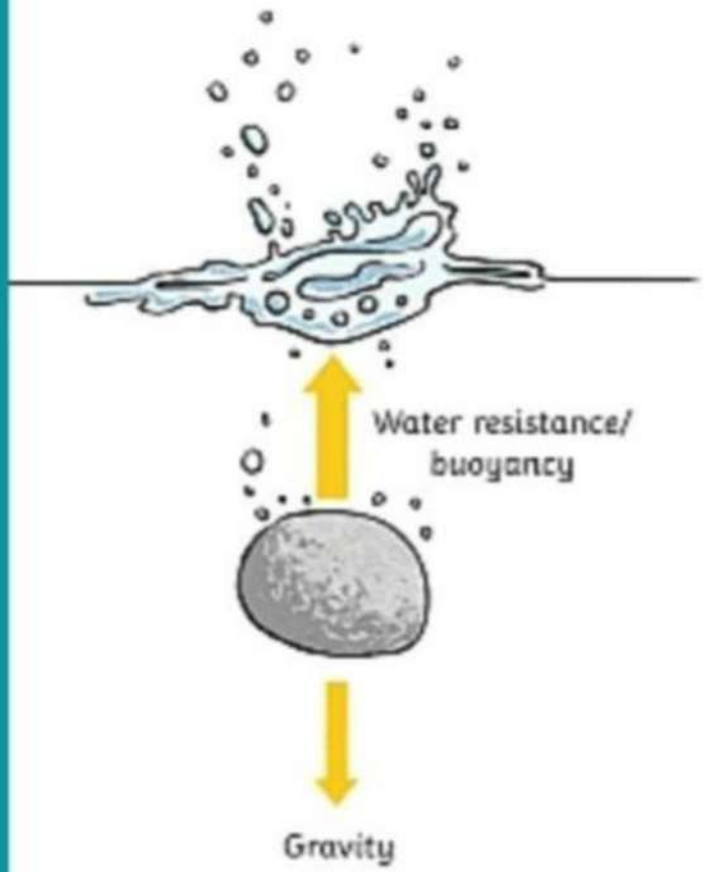
Consider a boat placed on top of the water surface. Have you ever thought about how the boat managed to stay on the top surface rather than sinking into it?
Buoyancy is the phenomenon that makes this happen. There is a term named "Buoyant force". The buoyant force acts on a boat to make it rise above the water.



Buoyancy force acting on a boat

Here g is the acceleration due to gravity and W is the weight of the boat.The boat tends to sink into the water soon after it is placed on the top layer of the water. This happens due to the gravitational pull (g) which is acting downwards. In order to make the boat float, there must be an upward force that acts in the opposite direction to that of the gravitational pull. The pressure of fluid always increases with the depth of the fluid. Assume that the boat is partially immersed. Now the pressure on the bottom part of the boat is larger than on the top which is present above the water level. Thus, a pressure difference will be created. This pressure difference leads to the generation of the upward force. This upward force is what we call the "Buoyant force".
There are few factors that affect the buoyancy of the boat such as

- The density of the water.
- The volume of water that is being displaced by the boat.
- Acceleration due to gravity.



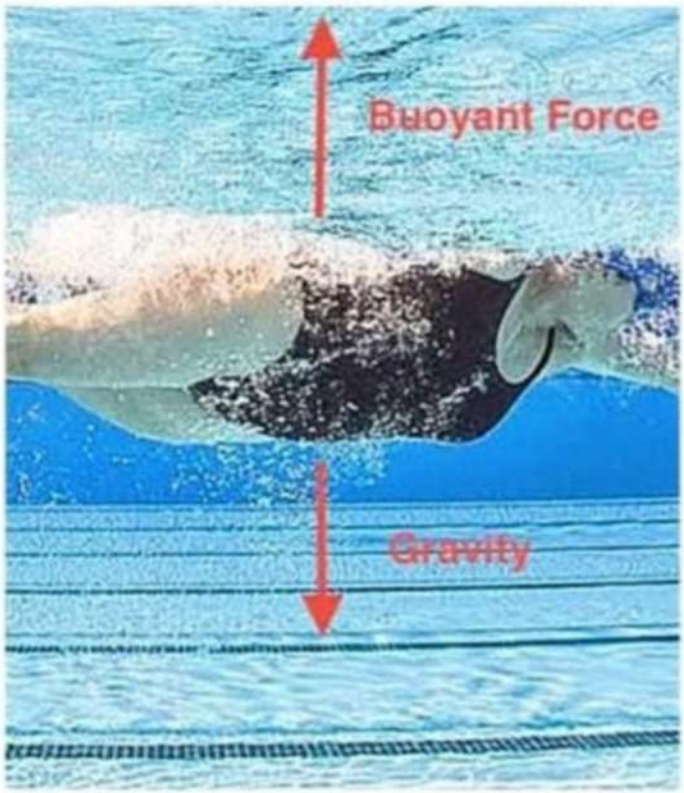
Buoyancy force acting on a stone

- If the magnitude of the buoyant force is greater than the sum of acceleration due to gravity and the weight, then the boat will go up and vice versa.

- If the magnitude is equal to the summation value, then the boat will start floating.

- Another application of the concept of buoyancy is found in the swimming event of the Tokyo Olympics 2020. In that particular event, swimmers have to float in the water rather than sinking into it. For that, they use the buoyant force which acts on the upper surface of the body.

If the density of the boat is higher than that of the water, then the boat tends to sink into the water and less volume will be displaced. If the density is lesser, then the boat will be pushed upwards and more volume will be displaced.



Buoyancy force acting on a body when swimming

FACTS

Aircraft are designed to withstand lightning strikes and they are regularly hit. Yet, lightning has not brought down an airplane since 1963.

AEROSPACE STARTUP

ASTRA UAV

Micro Class UAV for Demanding applications

Aero360 - Dronix Technology

FACTS

Emirates is the world's largest operator of Airbus A380 and Boeing 777 aircraft and is the one of only nine airlines in the world to operate an all wide-body fleet.

Aero360 - DroniX Technologies Pvt Ltd

Aero360, incorporated as Dronix Technologies Pvt Ltd, is a leading Drone Solutions startup company providing accurate high resolution Aerial Imagery based data products & services for businesses in Infrastructure, Energy & Utilities.

Their solutions deliver high accurate Topography data, 3D Digital Elevation Models, and Digital Surface Models (DSM) to enable better assessment, planning, surveying, inspection and, maintenance decisions.

Aero360 builds High-performance autonomous Drones for demanding applications reducing critical delivery times saving time, money and lives.

As the operations in marine environment are more challenging, Aero360 has brought together tested and integrated the best of technologies available to come up with the most efficient, reliable and robust Drone for demanding applications like Life jacket Delivery, Search and Rescue, Emergency Management, Intelligence, Surveillance and Reconnaissance, Commercial Delivery and Survey and Inspections.

Aero360 has a robust pilot network of Pilots from Asia, Africa, Australia & Europe. This network of Pilots helps the company in acquiring the data faster and at a fraction of cost.

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Miles to Nauts

History team *Jenita N*
Martin N

Icon of the month team *Sharankumar J*
Lalithkumar PS

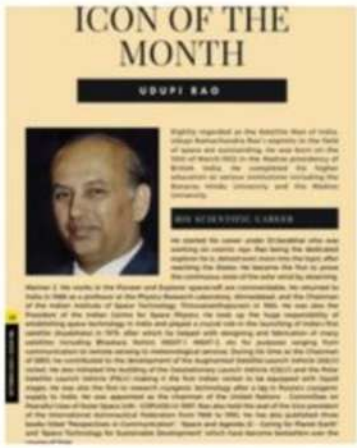
Innovation team *Haridharan K*
Durga Devi G

Life and Science team *G Rohan*
Laxana

Interview team *Akhila Ajith P*
Jaishri Prathiksha R

Editing team *Mahendran R*
Sreehara S

Designing team *Lalithkumar PS*
Martin N



HOD's NOTE :

Dr.SUNDARARAJ.K

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

STAFF COORDINATOR's NOTE :

Mr.DARSHAN KUMAR.J

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

VISION OF THE INSTITUTE

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

MISSION OF THE INSTITUTE

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

VISION OF THE DEPARTMENT

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

MISSION OF THE DEPARTMENT

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

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

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

I. To pursue a successful profession in leading organizations.

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

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

PROGRAM OUTCOMES (POs)

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

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

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

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

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

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

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

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

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

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

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

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

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

PROGRAM SPECIFIC OUTCOMES (PSOs)

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

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

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