ANTHARIKSH

The Space...

DEPARTMENT OF AEROSPACE ENGINEERING

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

MYLAVARAM, ANDHRA PRADESH, INDIA.

Vision of the Department:

To achieve academic excellence and produce highly competent professionals in the field of Aerospace Engineering

Mission of the Department:

DM1: To impart high quality education in Aerospace Technology through class room teaching and laboratory practice
DM2: To develop indigenous Aerospace Technology by carrying out research in collaboration with industry and research organizations
DM3: To train and inspire the student community to possess effective communication and leadership skills with ethical values
DM4: To harness the technological development by being consistently aware of societal needs and challenges

Program Educational Objectives (PEOs)

PEOs	Statement
PEO1	To provide students with sound mathematical, engineering and multidisciplinary knowledge to solve Aerospace and Allied Engineering problems
PEO2	To prepare students to excel in higher education programs and to succeed in industry/academia profession.
PEO3	To inculcate ethical attitude, leadership qualities, problem solving abilities and life-long learning for a successful professional career

PROGRAM OUTCOMES (POs)

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO3: Design/Development of Solutions: 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.

PO4: Conduct Investigation of Complex Problems: 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.

PO5: Modern Tool Usage: Create, select and apply appropriate techniques, resources, and modern engineering and IT tools including predictions and modeling to complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: 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.

PO7: Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: 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.

PO11: Project Management and Finance: 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.

PO12: Life-long Learning: 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)

PSO1: To apply the knowledge of Aerodynamics, Propulsion, Aircraft structures and Flight Dynamics in the Aerospace vehicle design

PSO2: To prepare the students to work effectively in Aerospace and Allied Engineering organizations

FOCUS AND SCOPE

A department magazine bridges the gap between students and faculty. Typically, a department magazine consists of Technical articles, ideas, project outcomes, language skills, literary articles, technical updates, success stories, career tips, academic advice, the latest events and happenings related to campus. Cover-stories have to be written in an engaging format. We can also include interviews of former students who have achieved success through dedication and hard work.

PUBLICATION FREQUENCY:

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Send your articles to the following mail ID.

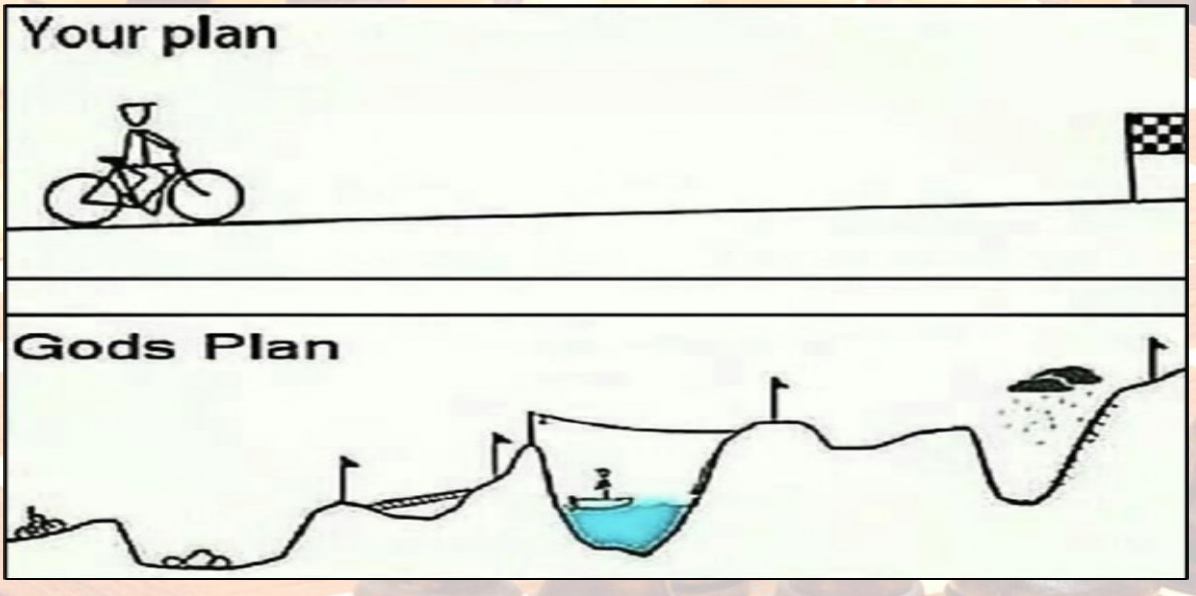
E-Mail: anthariksh.lbrce@gmail.com

Disclaimer

Some of the contents published in this magazine are from open sources. The contents of this magazine are for information purposes only, enabling the faculty and students to have easy and quick access to information and do not have any legal sanctity. This magazine is intended for circulation among students of the Department of Aerospace Engineering of LBRCE only.

FROM HOD's DESK

Reality is the plan created by GOD...
Sometimes God doesn't do the things the way we think he should.
But God has a perfect plan for your life.
He makes us to realize that :
"Life isn't about finding yourself.
Life is about creating yourself."
Life is 10% what happens to you and 90% how you react to it.
So,Trust God and live life honestly...



Dr. P. Lovaraju

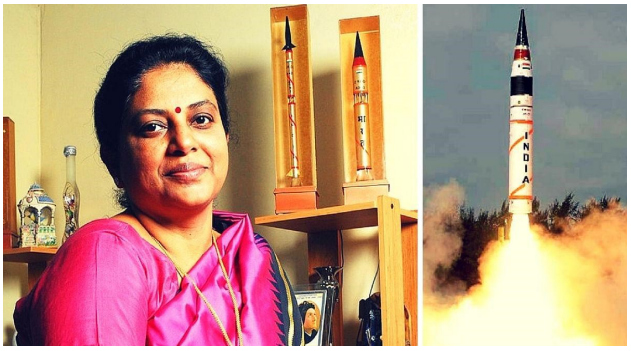
MISSILE WOMAN OF INDIA

TESSY THOMAS

M. Sowjanya

20761A5634

You can do anything you want to. But you have to work at it..



Inspiring To Many Women And Youngsters.. Dynamic And Multitalented Known As The 'Missile Woman' Of India, Tessy Thomas Is A Scientist At The Defence Research And Development Organisation(DRDO). She Served As The Project Director For The AGNI 4 And 5 Missiles, Making Her The First Woman To Lead Missile Teams In India. These Are Intercontinental Ballistic Missiles That Have Very High Ranges And Are Capable Of Carrying Nuclear Warheads.

Dr.Thomas' Expertise On The Solid Propellent Systems Were Critical In The Development Of The Re-Entry System Of The Missile, Which Helped It Withstand Great Velocities And Temperatures Of 3,000° Celsius On Re-Entering The Atmosphere.

Dr.Thomas Has Received Several Prestigious Awards For Her Work,Including The 'DRDO Scientist Of The Year',In 2008, DRDO Performance Excellence Award For 2011 And 2012, India Today Women Of The Year Award In 2009,Lal Bahadur Shastri National Award For Excellence In Public Administration In 2012,CNN-IBN Indian Of The Year In 2012, Sir Mokshagundam Visvesvaraya Award In 2016, And Outstanding Woman Achiever Award By Woman In Science And Engineering.

Dr.Tessy Thomas Was Not Only A Multi Talented Engineer But Also A Trailblazer For Women In Technology. In 2014,Thomas Became The First Woman To Be Inducted In To The Aeronautical Society's Space Pioneer Hall Of Frame – An Honour That Has Been Given To Only Five Other Indians Before Her.

One Of The Most Well-Known Leaders In The World, Dr.Tessy Thomas Is A Renowned Authority On Missile Technology And Women Empowerment. After Working On Missiles For More Than 30 Years,She Became One Of The Few Women To Be Given An Honorary Doctorate In Engineering From MIT.

In 1985, She Became A Full-Time Member Of The DRDO And Later Became The Head Of The Missiles Division At The Time.In 1988,She Took Over As Technical Director At HQITR. In 1996, She Became The Controller For Ballistic Missile Flight Test Programs At DRDO Which Is Responsible For Managing All National Missile Programs.

Important Lessons That We Can Learn From The Life Of Dr Tessy Thomas Are:

Courage, Determination, Reinforcement, Patriotism, Loyalty, Knowledge, Focus'

She Was Not Afraid To Stand Up And Voice Her Opinion In An Area Of Extreme Conflict.She Was Determined To Do Something About One Of The Biggest Issues Going On In India At That Time. She Learned From Mistakes That She Made After Trying A Different Approach To A Project Where It Did Not Work A Failure Can Be Useful As Success When Learning New Things. She Was Strong And Loyal To Her Country. Even Though She Was A Woman. She Didn't Give Up On Finding A Solution Once She Knew What Would Work And What Wouldn't.

Dr Tessy Thomas Apart From Being Known As The Missile Woman Of India Is Also Known For Her Bravery, Courage,Patriotism,And Loyalty In Service To Her Country And Her Society In General.

GENDER DOES NOT MATTER.

YOU WORK AS A SCIENTIST, NOT AS WOMAN....

ZERO-FUEL AIRCRAFT

Mohammad Arshad Shaik
20761A5647

Airbus recently revealed three concepts for the world's first zero-emission hydrogen commercial aircraft, which could enter service by 2035. These concepts each represent a different approach to achieving zero-emission flight by exploring various technology pathways and aerodynamic configurations in order to support their ambition of pioneering the decarbonization of the entire aviation industry. All of the concepts presented by Airbus rely on hydrogen as a primary power source – an option

which they believe holds exceptional promise as a clean aviation fuel and is likely to be a solution for aerospace - and many other industries - to meet their climate-neutral targets.

"This is a historic moment for the commercial aviation sector as a whole and we intend to play a leading role in the most important transition this industry has ever seen. The concepts we unveil today offer the world a glimpse of our ambition to drive a bold vision for the future of zero-emission flight," said Guillaume Faury, Airbus CEO. "I strongly believe that the use of hydrogen – both in synthetic fuels and as a primary power source for commercial aircraft – has the potential to significantly reduce aviation's climate impact."

The three concepts – all codenamed "ZEROe" – for a first climate neutral zero-emission commercial aircraft include: A turbofan design (120-200 passengers) with a range of 2,000+ nautical miles, capable of operating trans continentally and powered by a modified gas-turbine engine running on hydrogen, rather than jet fuel, through combustion. The liquid hydrogen will be stored and distributed via tanks located behind the rear pressure bulkhead.

A turboprop design (up to 100 passengers) using a turboprop engine instead of a turbofan and also powered by hydrogen combustion in modified gas-turbine engines, which would be capable of traveling more than 1,000 nautical miles, making it a perfect option for short-haul trips.

A "blended-wing body" design (up to 200 passengers) concept in which the wings merge with the main body of the aircraft with a range similar to that of the turbofan concept. The exceptionally wide fuselage opens up multiple options for hydrogen storage and distribution, and for cabin layout.

"These concepts will help us explore and mature the design and layout of the world's first climate-neutral, zero-emission commercial aircraft, which we aim to put into service by 2035," said Guillaume Faury. "The transition to hydrogen, as the primary power source for these concept planes, will require decisive action from the entire aviation ecosystem. Together with the support from government and industrial partners we can rise up to this challenge to scale-up renewable energy and hydrogen for the sustainable future of the aviation industry." In order to tackle these challenges, airports will require significant hydrogen transport and refueling infrastructure to meet the needs of day-to-day operations. Support from governments will be key to meet these ambitious objectives with increased funding for research and technology, digitalization, and mechanisms that encourage the use of sustainable fuels and the renewal of aircraft fleets to allow airlines to retire older, less environmentally-friendly aircraft earlier.


Turbofan design


Turboprop design


Blended-wing design

MY TEACHING PHILOSOPHY

I. Dakshina Murthy
T590

The Motive:

It was during my post-graduation when I became enthusiastic about the teaching while listening to one of my professors, who later became mentor of my life. Also, during my graduate studies, one of my professors, the way he taught the courses, I developed my interest on Thermal and Fluid Sciences in Mechanical Engineering. Hence, I realized that a good teacher could make someone to become passionate about the courses as well as teaching. In my experience, I also understood that the students will always follow a good teacher to get succeed. I believe that Teaching is a noble profession since it is about making the students thirsty towards learning the skills for their holistic development.

The Introductory Lecture:

When I joined in my teaching profession in 2012, I had the opportunity to teach undergraduate students of Aerospace Engineering Department. The first course that I taught was 'Aircraft Systems and Instruments'. I started delivering the course contents directly and after a couple of classes I sensed that the students are not showing interest towards the course. That is the moment when I realized that this might not be the proper way to start the course. After discussing with the senior fellow faculty, upon my own analysis, and feedback from the students, I came to know the importance of ***"Introductory Lecture" (Integrated with course objectives, course contents, engineering applications, real-life applications, questionnaire (the answers will be provided/known/understood as the course progresses) and course outcomes)*** about the course which in turn makes the students connected to the course. Thereafter I used to open any course with a ***"Introductory Lecture"*** which helps in improving the students' interest towards the course, I believe.

The Methodology:

To carry forward the interest created in the introductory lecture the delivery methodology plays a crucial role. The methodologies include ***chalk & talk, a presentation, tutorial session, laboratory demonstration, and filed/industry visit***. The selection of a methodology is based on the content/ topic to be discussed. The following are the few examples

- The course like Thermodynamics is more contended with conceptual knowledge. So, the ***Chalk & Talk method*** is more suitable for these kinds of courses. In addition, this course also involves understanding the concepts by problem solving. Hence more ***tutorial sessions*** are helpful along with the chalk & talk sessions.
- The courses like Fluid Mechanics, Applied Thermodynamics and Gas Dynamics equipped with the contents those can be demonstrated in the laboratory. For instance, the concept of U-tube manometer in Fluid Mechanics, internal combustion engines in Applied Thermodynamics and nozzle flow physics in Gas Dynamics course can be better understood by the laboratory demonstration
- The courses like Aircraft Systems & Instruments and Instrumentation & Measurements in Fluids involve learning the Operating Principles and working of various systems & instruments. Hence while delivering the Lectures, the presentation (PPT/Video) is more suitable for these kinds of courses. However, a field/ industry visit, where the students can see the working/operation of various instruments and systems, might be helpful to get the complete understanding.

To summarize, all/few methodologies stated above may be used during the course delivery. However, according to a specific course a/couple of methodologies might dominate the other to enable better learning.

The Role of Cognitive Abilities:

The teaching methodologies those stated in the previous section are helpful to improve the low-level cognitive abilities of the students like Remember, Understand, Apply and Analyze. These abilities of the students will be evaluated through the term examinations and semester end examinations, which are time bound. To make the students to achieve the high cognitive levels of learning like Design and Create in any course, as the instructor, a set of questionnaires (Assignment) those are prepared will be supplied to the students. The student in turn must submit the answers to those questions (which are not time bound). The answers might be of text form, presentation (flipped classroom), prototype, and working model too. The following are

* In Thermodynamics course, I may ask the student(s) to prepare a model/prototype to demonstrate the Zeroth law of Thermodynamics and First law of Thermodynamics.
* In Fluid Mechanics course, I may ask the student(s) to prepare a model/prototype to demonstrate the Pascal's Law. Also, I might ask the students to prepare a set up to conduct the Reynold's Experiment, verify the Bernoulli's theorem etc.
* In Elements of Aerospace Engineering, I may ask the students to prepare a Monogram/ prototype of an aircraft component which will tap the student ability in soft skills and interest towards the program.
* In Instrumentation & Measurements in Fluids, I may ask the students to construct an instrument to measure a parameter in fluid flows.

The Ability of Students:

As my teaching carrier progresses, I understood that every student learns differently because of their own abilities. Consequently, the score they gain will also differ from each other. Based on their score in the first assessment of each course that I taught and with my keen observation I used to classify the students as Fast Learners and Slow Learners. Though I deliver the lecture without any discrimination among the students, I will always try to deliver in such a way that the Slow Learner is able to grasp the content and apparently the Fast Learner. Apart from the regular teaching, the following are the things that I will do for both the groups of students.

Fast Learners:

⇒ I will encourage them to do certification courses offered by various universities parallel to the course and hence they will be globally competent

⇒ I supply a questionnaire that will help them to enrich their conceptual knowledge and problem-solving ability

Slow Learners:

⇒ A special concertation will be made on this category of students during the tutorial sessions to ensure that they can cope up with the problem-solving abilities

⇒ A professionally written study material/videos lectures will be supplied to ensure the improvement in the conceptual knowledge.

The importance of personal interaction:

I strongly believe that the learning process is greatly influenced by the relationship between the teacher and student. For instance, and true, we used to give utmost respect for the words/talk of a person with whom we are in a particularly good relationship, I believe personally. Also, to create a positive learning environment in the classroom the students should feel like the teacher is supportive and caring (supportive teacher). The personal interaction between the student and faculty will lead to a relationship. When the relationship builds and became strong, the teacher can motivate the student to learn and hence the personal and professional development of the student is assured. A good relationship will create a positive learning environment in the classroom. That certainly impact students interests in classroom and therefore their level of learning and achievement(s).

References:

[1] "Outcome based pedagogical principles for effective teaching" an online certification course offered by Indian Institute of Technology Kharagpur through NPTEL, India during Aug-Sep, 2018 https://nptel.ac.in/courses/121105010

[2] "Effective Engineering Teaching in Practice" an online certification course offered by Indian Institute of Technology Madras through NPTEL, India during Feb-Mar, 2018 https://nptel.ac.in/courses/121106012

[3] da Luz, Fredson Soares dos Reis. (2015). The Relationship between Teachers and Students in the Classroom: Communicative Language Teaching Approach and Cooperative Learning Strategy to Improve Learning. In BSU Master's Theses and Projects. Item 22. Available at http://vc.bridgew.edu/theses/22

FACT AHEAD!!!

A surprising phenomenon is that cold water heats up faster than hot water! This is known as the Mpemba effect.

DID YOU KNOW ?

The Sun is gradually expanding. By this time in 2.3 billion years, it will no longer be safe for life to persist on Earth - It'll be too hot

MANGALYAAN QUIETLY BIDS GOODBYE: INDIA'S MAIDEN MARS MISSION RUNS OUT OF FUEL

N. Meena Mahitha

20761A5638

Mangalyaan was launched in 2013 onboard PSLV-C25 by ISRO

Over a decade after it was launched, India's maiden mission to Mars Mangalyaan has completed its journey. The Mars Orbiter Mission (MOM) has, reportedly, run out of propellant, making it difficult to be revived in the Red Planets orbit.
This development is fuelling speculation that the mission is finally over. The Indian Space Research Organisation (ISRO), which operates the spacecraft around Mars, is yet to say anything on the matter of whether the probe can be revived or not. "Right now, there is no fuel left. The satellite battery has drained," sources in the Indian Space Research Organisation (ISRO) told PTI, adding that the link has been lost.

Recently there were back-to-back eclipses including one that lasted seven-and-half hours. As the satellite battery is designed to handle an eclipse duration of only about one hour and 40 minutes, a longer eclipse would drain the battery beyond the safe limit, PTI reported, quoting unnamed sources.

The mission had already exceeded expectations as it remained operational for over eight years when it was designed for a six-month-long mission around Martian orbit.

Mangalyaan was launched in 2013 onboard PSLV-C25 as the first interplanetary mission from India, making ISRO the fourth space agency in the world to launch such a mission beyond Earth's orbit. The spacecraft was a demonstration mission aimed at establishing that India could design, launch and operate a mission on another world.

Developed at just Rs 450 crore, the mission to Mars from India was one of the most cost-effective interplanetary missions ever designed.

The spacecraft was equipped with five instruments to study the Martian surface features, morphology, mineralogy and the Martian atmosphere. The five instruments included the Mars Colour Camera (MCC), Thermal Infrared Imaging Spectrometer (TIS), Methane Sensor for Mars (MSM), Mars Exospheric Neutral Composition Analyser (MENCA) and Lyman Alpha Photometer (LAP).

"MOM is credited with many laurels like cost-effectiveness, a short period of realisation, economical mass-budget, and miniaturisation of five heterogeneous science payloads", ISRO officials pointed out.

India has been planning to launch another mission to Mars in the coming years, which is also likely to be an Orbiter. Former ISRO chief K Sivan, during his tenure in 2021, said,"Mangalyaan-2 will be undertaken only after the launch of Chandrayaan-3, India's upcoming Moon mission." He added that the space agency had asked the scientific community for suggestions on possible experiments and it is in the process of receiving these.

"KINGFISHER" THE NATURE'S GIFT TO THE BULLET TRAINS

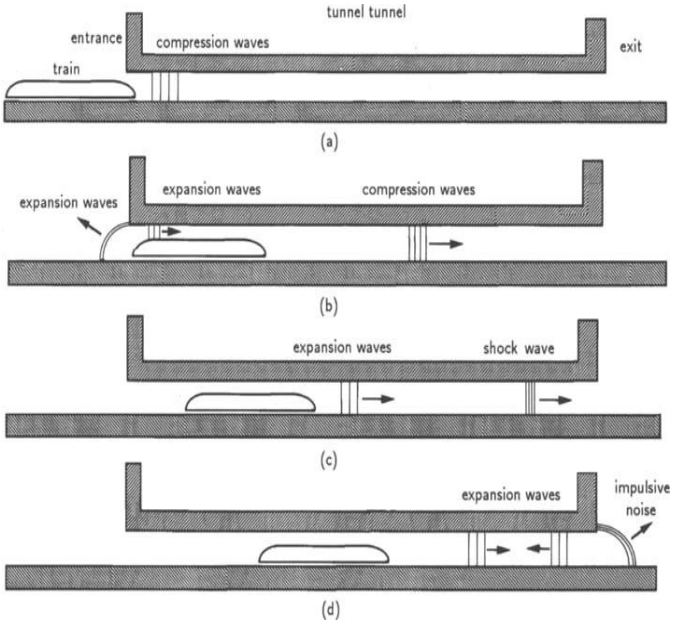
Poliboina Dharani

20761A5644

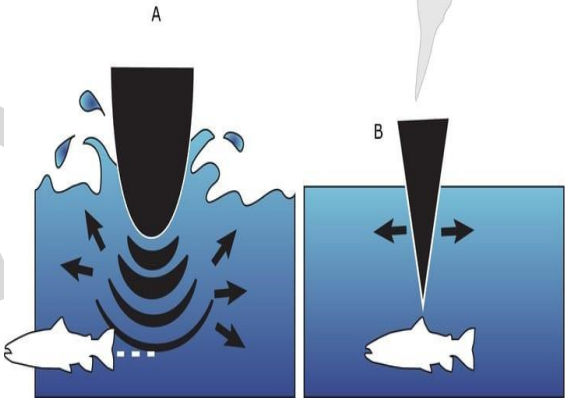
The Shinkansen bullet trains in Japan were conceived in the early 1900s as a means of high-speed travel. They succeeded in their job, however, due to travelling at 200 miles per hour (about 320 kph), they generated noise levels that could be heard 400 metres away. This was due to changes in air resistance when the trains entered tunnels creating low -frequency atmospheric pressure waves. To function effectively without creating so much noise, the Shinkansen trains needed a structural redesign that would allow them to deal with abrupt changes in air resistance around them.

The sonic boom problem is a complex one. Whenever a train sped into a tunnel, it generated atmospheric pressure waves that reached the tunnel exit at the speed of sound. Like a piston in a cylinder, the train was forcing the fluid air out of the other end of the tunnel. The air exited in low-frequency waves (under 20Hz) that produced a large boom and aerodynamic vibrations. This problem was particularly troublesome because it was tied to both the geometry of the tunnel and the speed of the train. The micro pressure of the wave was in proportion to the ratio of the cross-section of the trainset to that of the tunnel. Moreover, every unit increase in speed was producing an increase in pressure to the power of three.

The design team would have to find a way to redesign the shape of the train to go faster without creating the boom. The key was in preventing the pressure wave build up by reducing the cross-sectional area of the train and redesigning its nose. The engineers observed that the test train seemed to "shrink" when it was traveling through the tunnel. Nakatsu reasoned that it must be due to a sudden change in air resistance, from open sky to closed tunnel, and wondered if there was an organism that was adapted to such conditions.

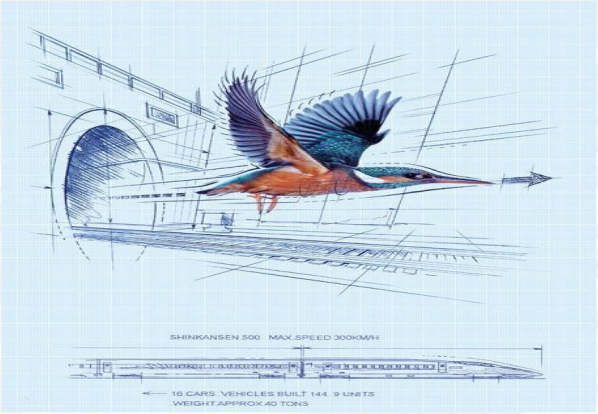


From his birdwatching experiences, Nakatsu remembered the kingfisher, a bird that dives at high speed from one fluid (air) to another that is 800 times denser (water) with barely a splash. He surmised the shape of its bill was what allowed the bird to cut so cleanly into the water.

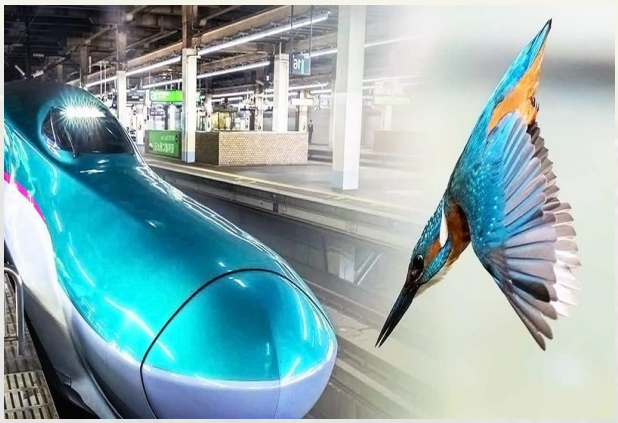


The JR West team analysed the bill of the kingfisher and found it had just the streamlined shape that modelling at the University of Kyushu had predicted as one that was optimum: a rotational parabolic body. Both the upper and lower beaks of the bird have triangular cross-sections with the sides of the triangles being curved. Together, they form a squashed diamond shape.

[P.T.O]



Informed by these parameters, the design team set about to test various nose shapes in a to-scale model tunnel and measure the pressure waves generated. They shot bullets of various shapes into a pipe, from the more traditional bullet nose to a shape modelled after the kingfisher. Further tests compared model solids dropped into water to record the splash. Concurrently these same shapes were run in simulations on a space research supercomputer. A train nose very similar to the kingfisher was then selected.



All the tests confirmed the kingfisher bill was, indeed, the most efficient of all those tested, besting all alternates by a wide margin. Refined prototypes were built and ultimately made to full-scale for test runs on the tracks. It was at this point that Nakatsu became convinced that nature had much to teach about efficient forms.

The design reduced the sonic boom effect and allowed the train to run at higher speeds and still adhere to the standard noise level of 70 dbs. It also reaped further benefits immediately.

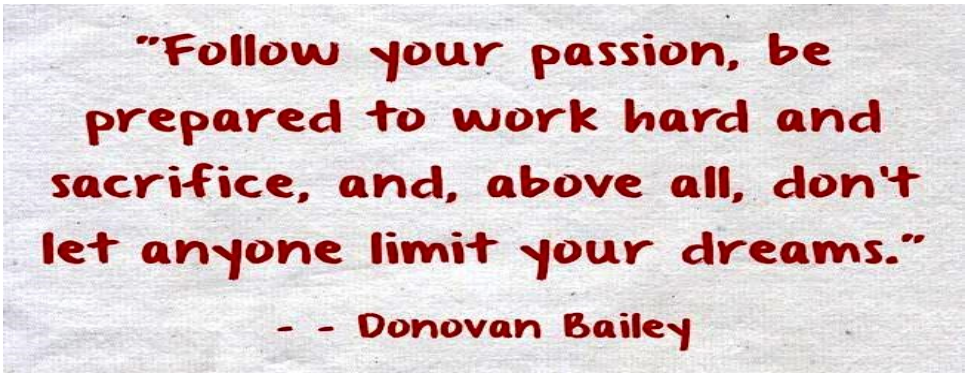
The new Shinkansen 500 had 30 percent less air resistance than its predecessor. Energy consumption was reduced proportionally. A measured actual train run (maximum 270 km/hr) showed a 13 percent reduction in the power that had been needed by the predecessor 300 series. On March 22, 1997, JR-West put the 500-Series Shinkansen electric train into commercial service. The train was able to run at 300km/h at its maximum, a world speed record at the time, and meet the stringent noise standard. Traveling time between Shin-Osaka and Hakata had, as the company had challenged, been shortened, from 2 hours and 32 minutes taken by the conventional 300-Series "Nozomi" train to 2 hours and 17 minutes.

From the study of natural forms had come some basic geometry that could be analysed, tested, and reverse-engineered for an adapted improvement in the shape of a vehicle. This more efficient form reduced the turbulence that caused the initial problem of noise, and this, in turn, reduced the power needed to move passengers. Less power needed; less fuel consumed; less money spent.

Thus, the new models inspired by the kingfisher and reduced noise.

LIFE GOES ON!

Praveen Kumar Baluguri
21761A5604



One day a son came to his father for some advice:

– Dad, I can't do this anymore, – he said, – those lessons only exhaust me, and the result doesn't change. It must be not destined for me to play football and my dream will never come true.

The father looked at his son with loving eyes and said:– You know son, every person in life has a dream, a goal of his life. They are the ones that make us do what we are doing because it's what we should do. We must fight for what we believe in, what we feel. In other case, you will simply break. Once – and for all.

The easiest way is to quit everything and not reach the end, because the path is difficult, and we are not used to inconveniences. We want everything to be easy and at once. But the wishes are fleeting! This is how our dream dies, and the goal becomes unreachable.

Gradually, life becomes a routine without depth and meaning. Then one day, we try to forget and start everything from the beginning, we wait for a new day to make our life different. But new obstacles come in our way, and we stop again. We become desperate and angry for our helplessness.

But you only need to remember one thing: never give up, fight, battle. It doesn't matter if you have lost one battle or dozens of battles. Life goes on! Your biggest enemies are hiding in you – laziness, fear, doubt, indecision. Be a warrior of your dream, a knight of your goal and a soldier of your wishes!

DID YOU KNOW ?

It takes a photon up to 40,000 years to travel from the core of the sun to its surface, but only 8 minutes to travel the rest of the way to Earth

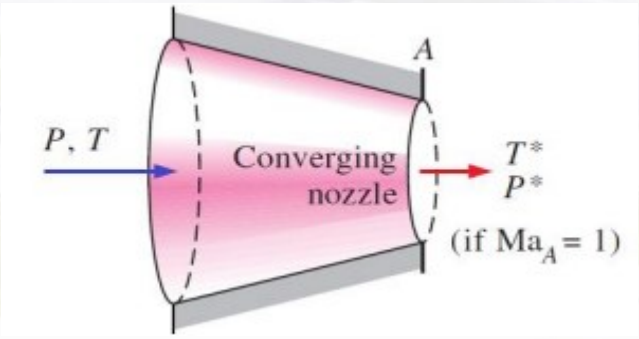
NOZZLE FLOW PHYSICS

Kurapati Ruby
20761A5629

Nozzle is a flow accelerating device. In the domain of Aerospace, we generally come across three major types of nozzles, namely Convergent, Divergent and Convergent-Divergent. It calls for an individual study on the flow behavior across each of these three nozzles, as they impose various exit conditions depending upon the pressure ratio set across and the regime of flow (subsonic or supersonic) entering into them.

The Convergent Nozzle:

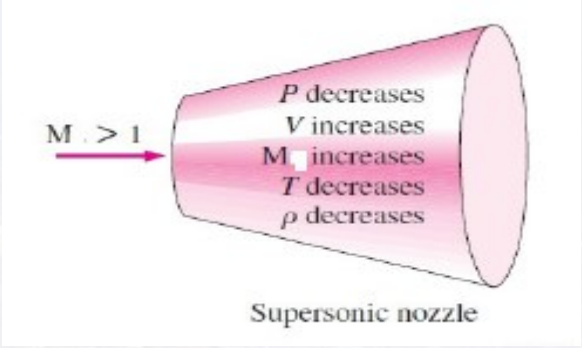
A convergent duct acts as a nozzle only when a subsonic flow enters into it (since Area* Velocity is a constant for subsonic flows) and acts as a diffuser if it were a supersonic flow entry.



- The flow would be initially at rest when there is no pressure difference across the nozzle. Air starts flowing across it, once we start decreasing the back pressure. As the back pressure is further lowered, the Mach number (Local flow speed/Local speed of sound) and the mass flow rate gradually increase.
- On further reducing the back pressure to such a magnitude that the ratio of exit pressure to inlet pressure (P/P0) becomes 0.528 (if air), the nozzle no more exceeds its mass flow rate and Mach number, on a further decrease in back pressure. The Mach no. reaches to a maximum of 1(since the pressure ratio 0.528 corresponds to M=1 by isentropic relations of compressible flow) at the exit and the nozzle is said to be choked.

The Divergent Nozzle:

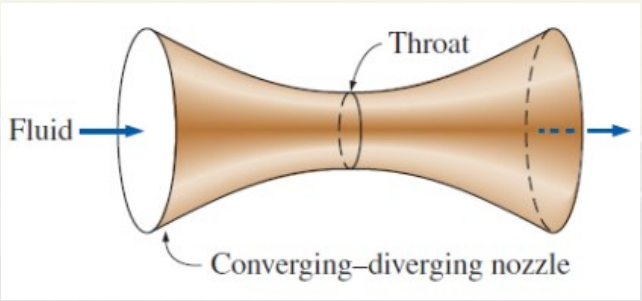
A Divergent duct acts as a nozzle only when a supersonic flow enters into it (since Area/Velocity is a constant for supersonic flows) and acts as a diffuser if it were a subsonic flow entry.



- Although it is physically not possible for a supersonic flow to enter into any duct due to the formation of a bow shock, if a complete supersonic, isentropic flow were established inside a diverging area duct, the flow would get accelerated to further supersonic.
- If the flow entering into it is subsonic, it acts as a diffuser that further decelerates the flow. In this case the flow inside the duct cannot even attain a Mach number of 1, though the pressure ratio set across it is 0.528.

The Convergent-Divergent (CD) Nozzle:

A CD nozzle consists of a convergent portion followed by a throat (min. area) and a divergent portion. So far, it is the only nozzle, capable of generating supersonic flow at its exit.



[P.T.O]

The ratio between the local area and its choking area (Area ratio, A/A*) is the key parameter which dictates the local Mach no. that has to be generated at that particular location inside the nozzle. The relation between the Area ratio and the local Mach no. is as follows:

$$\left(\frac{A}{A^*}\right)^2 = \frac{1}{M^2}\left[\frac{2}{\gamma+1}\left(1+\frac{\gamma-1}{2}M^2\right)\right]^{(\gamma+1)/(\gamma-1)}$$

This relation unveils the fact that any CD nozzle can generate supersonic flow of only a single Mach no. But the above relation gives us two Mach numbers for an area ratio when solved- a subsonic and a supersonic Mach number, the occurrence of which will be seen in the subsequent lines. Thus, the area ratio acts as a design parameter for any CD nozzle.

Let us try to understand the flow behavior across a Mach no. 1.75 CD nozzle connected to a reservoir at 68atm. At the exit, the nozzle has A/A*=1.386. Listed and detailed below are the cases that would occur by and by as the back pressure is gradually decreased.

Case 1:A subsonic flow is established across the nozzle, when we start decreasing the back pressure. Say, to 60atm (since it is more than the maximum back pressure to choke the nozzle), which is also equal to the exit pressure, since the flow is subsonic.

- The flow accelerates from inlet to throat and decelerates into an even lower subsonic Mach no., as it traverses from throat to the exit.
- This happens over a range of back pressures until the nozzle chokes.

Case 2:

When the back pressure is reduced to 58atm, which is the maximum back pressure to just choke this Mach 1.75 nozzle for the given stagnation conditions, the flow behavior is as follows:

- The flow is subsonic in the convergent portion and accelerates in the downstream direction. The nozzle chokes at the throat for the first time and continues to choke for any further decrease in back pressure (=exit pressure).

- Since the flow is completely isentropic in the duct, every location in the flow field has the same choking area location. It is the throat that has to choke because, choking occurs at the location of minimum area in the duct (since dA/A=0 for M=1).
- The flow decelerates to an even more subsonic regime in the divergent portion. The subsonic roots from the Area ratio - Mach number relation, now occur on either sides of the choked throat.

Case 3:

On further reducing the back pressure, a Normal Shock wave prevails inside the divergent portion, ahead of which, the flow is supersonic and is subsonic behind it.

- The shock moves downstream for every small reduction in back pressure from thereon, making the flow across it irreversible-adiabatic. It consequently demands for a separate analysis of this particular flow field without involving isentropic relations.

- The throat of the nozzle no more acts as the choking area location of the isentropic flow behind the shock wave.

- When the back pressure is reduced to a magnitude of 43.53atm, the normal shock stands at the exit of the CD nozzle and the back pressure is still equal to the exit pressure. From the throat to the exit, the nozzle contains continuous supersonic flow with Mach numbers corresponding to the area ratio of that particular location.

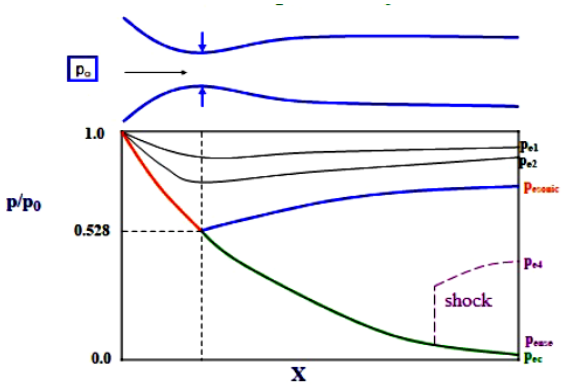
Case 4:

Any small further reduction in back pressure, pushes the normal shock out from the exit, generating the supersonic Mach no. it is designed for (M=1.75 in this case).

- There would be no change in the properties of flow inside the duct, once the desired supersonic Mach no. comes out. The changes only happen near at the exit.

- The levels of expansion the flow undergoes are:

1. Over-Expansion (exit pressure<back pressure).
2. Correct-Expansion (exit pressure=back pressure): It occurs when the back pressure is reduced to 12.78atm for this nozzle and is different for every area ratio.
3. Under-Expansion (exit pressure>back pressure).



WORDS THAT ENLIGHTEN ME

Sushma Swaraj Muni

21761A5627

This is something that inspired me a lot it's a speech of my favourite idol RM from BTS a Korean Boy Band . The whole speech is about loving yourself, believing in yourself and speaking for yourself. This speech literally changed my way of thinking from then. I suggest the person reading this to listen to the speech of RM at UNICEF. In this speech RM speaks about the childhood dreams where we would think that we are the super heroes saving the world which is not stupid it's just pure innocence of the childhood. Then growing up it all changed we started to worry about what other people think of us and started seeing ourselves through their eyes. Then we jam into the moulds that other people made. We stop listening to our own voice and start listening to others. This is how the whole youth is , we don't listen to ourselves. We always doubt ourselves.

We must face many problems to survive in this world. There will be more problems, and everything will have a solution. May be in facing these problems you have made a mistake, IT'S OKAY . RM says a line in the speech " I am who I am with all my mistakes and faults . These faults and mistakes are what i am making up the brightest stars in the constellation of my life".

This was like my agenda or a motivation line that motivates me every time. After listening to this speech, I have come to love myself with all my mistakes and faults. I started loving myself for who I actually am. I started believing in myself that I can do anything if I am interested .I stopped comprising for something that's mine. I learnt to love myself. I wish the person reading this would love him/her self and speak for him/her self .I have many faults but I am learning to embrace all my faults and starting to love myself a little by little . May be the reason why I am writing this article because I believe in myself that I can write this and so did I ....

UNIVERSE EXPANSION

Sarawani Manikonda

21761A5622

We all know that a star will convert into a black hole when all of its fuel's used up. Then it'll create a strong attractive force, at which even the light can't escape. That means if we consider the speed of light versus the speed of black hole attraction, we can understand that speed of light is lesser in comparison. This could even be applied to the expansion of our universe.

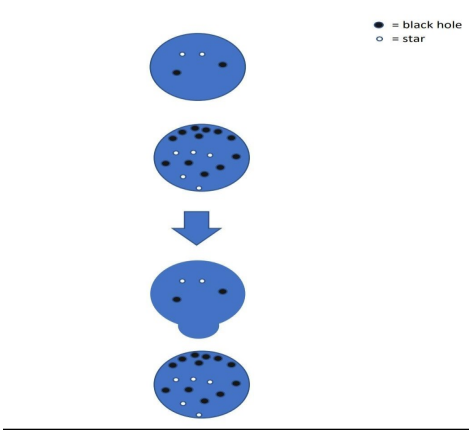
If we consider multiverse, our universe could be imagined as a bubble that's floating in between several other universes, while expanding. This can be explained as below.

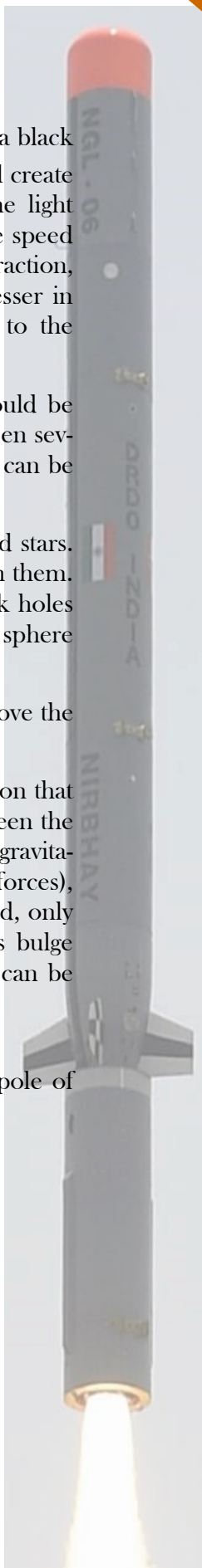
Any universe, contains both black holes and stars. Black holes have a lot of attraction power in them. If we think in this way, like density of black holes hanging over the north pole of a universal sphere (purely logical imagination)

then the other universe which is floating above the former one, gets attracted towards it.

Due to inertia, or could be due to the reason that there's no particular string connection between the heavenly bodies (in that universe) but weak gravitational force (which is the weakest of all forces), instead of getting whole of it's bubble moved, only a part of it moves, like a new bulge. This bulge occurrence, I believe, is faster than light, can be called as expansion of the universe

This bulge, if we imagine, is in the south pole of the latter universe.





METHODS OF SPACE TRAVEL IN FUTURE

M.Bhuvaneshwari
T846

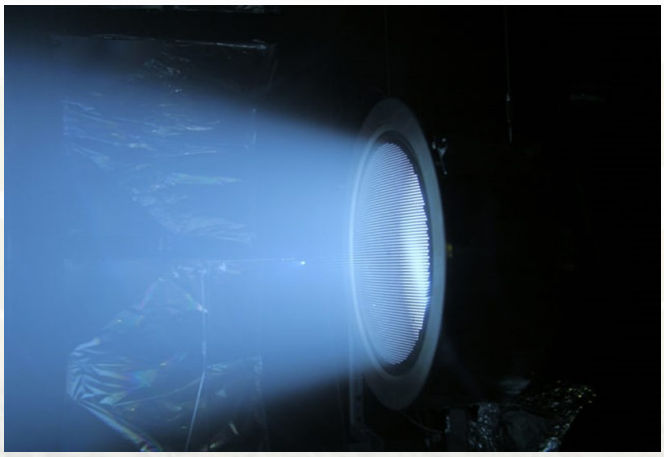
Ion Thrusters

Ion thrusters shouldn't be a new concept to Star Wars diehards, because they power TIE Fighters. They're a real thing that was used on NASA's Dawn probe that was launched in September 1997 to study the dwarf planets Vesta and Ceres. Ion thrusters work when xenon atoms are hit with electrons, forming ions. At the back of the engine, there are metal grids charged to about 1,000 volts that shoot out ions at 90,000 miles per hour. The thrust is quite small, but since space is a frictionless environment with zero gravity it gradually builds up. The top speed of Dawn is 24,000 miles per hour.

Ion thrusters require minimal fuel. In fact, they're 10 times more effective than chemical fuels. They get their power from large solar panels, so there's no need to build storage for fuel. That also gives them an inexhaustible source of energy. The current problem with ion thrusters is that they're a bit too slow to transport humans. With, they could be used to transport supplies to, say, a settlement on Mars.

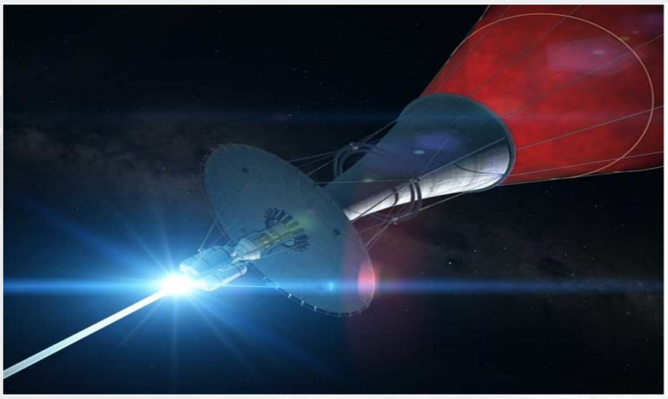
2. Bussard Ramjet

As alluded to above, one of the biggest problems



facing space travel is the amount of fuel needed. One attempt to overcome this came from the 1960s and was called the Bussard Interstellar Ramjet. The idea is that the spacecraft would pick up protons in the universe while traveling. If these protons could then be fused together, the spacecraft could use nuclear rockets.

However, there are several problems with the Ramjet. Only a certain number of protons could be picked up, and a lot of drag would be generated when the vessel would collect protons. Also, there's the little matter of getting a stable nuclear fusion de-



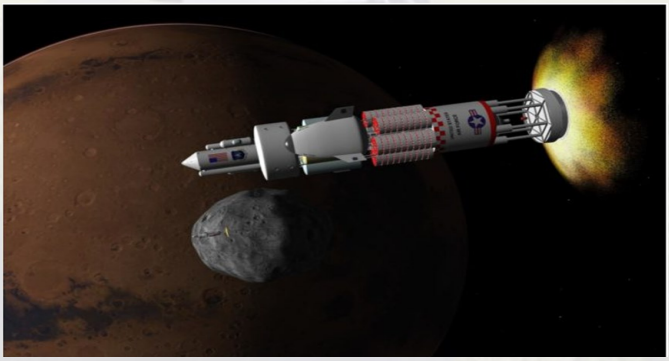
vice functioning.

3.Nuclear Pulse Propulsion

The idea of using nuclear power to launch spaceships dates back to the 1950s. Project Orion was an endeavor by NASA that entailed a ship the size of the Empire State Building being launched by exploding a nuclear bomb under it. You can probably guess some of the problems with this. For starters, this method would leave a tremendous amount of radiation behind and give the astronauts radiation poisoning.

When the bomb went off, it would create an electromagnetic pulse that would wipe out all the onboard electronics. That's if the launch was successful and didn't result in a deadly accident. Despite all of this, Project Orion was considered because it could travel to Mars and back in three months, while it would take a spacecraft using normal propulsion 18 months to do the same trip.

Orion was abandoned, but ideas from the project lived on. *Voyager 1, Voyager 2* and the *Cassini* spacecraft use a form of nuclear power that takes decaying plutonium and converts it to electricity.

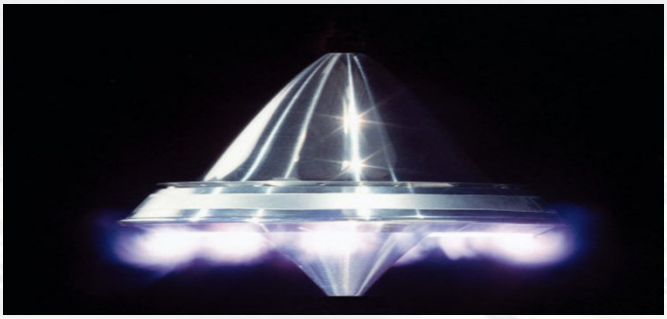


[P.T.O]

4.Laser Beamed-power Propulsion

Aerospace engineer and awesomely named Leik Myrabo got the idea of using laser beamed-power propulsion in 1988 when he was working on the Star Wars missile defense project. Myrabo's craft would be conical. A powerful laser beam would be fired into the narrow end of the cone, which would contain a parabolic reflector.

This would heat the air inside to about 30,000 degrees, which would cause explosions that would create thrust. Myrabo believes that he could have a



spacecraft ready in 20 years, but his peers are skeptical as to

5.Daedalus Interstellar Spacecraft

The British Interplanetary Society conducted a five-year study beginning in 1973 to see if it was possible for humans to travel to Barnard's Star, which is about six light years away. Their solution was the Daedalus Interstellar Spacecraft. The Daedalus was a huge spacecraft, also nearly the size of the Empire State Building, and would need to be constructed in the Earth's orbit.

Like Project Orion, it would use fusion engines. Pellets of fuel would be injected at high velocity into a reaction chamber, where high-energy electron beams would ignite them. The first stage would launch from Earth with 46,000 tons of fuel, and then once in space it would launch a smaller part of the ship that would carry 4,000 tons of fuel. The fuel needed was Helium-3. Helium-3 is incredibly rare on Earth, but it's believed there's quite a bit on the moon, and there are also clouds of it in space. Collecting enough could take 20 years. Helium-3 is also the most difficult fusion fuel to ignite because of the incredible amount of heat needed. However, if it worked, the spacecraft would eventually travel at 12.2 percent of the speed of light, meaning it would get to Barnard's Star in 50 years.

In 2009, an update called Project Icarus began its five year study to see how interstellar travel might now be done after years of scientific advancement. Hopefully they're putting more thought into the science than the name.

6.Asteroid Hopping

One of the big problems with traveling in space is exposure to cosmic rays. If a person were to do a 1,000 day round trip to Mars, they would be exposed to so much radiation that it would increase their chances of getting cancer from one to 19 percent. Spacecraft are made of light material, and radiation shields are too heavy. That's why a professor of physics at MIT believes the best way to travel would be to land on an asteroid and then tunnel below its surface.

The asteroid would need to be 33 feet wide and pass within a couple million miles of both Earth and Mars for the plan to work. There are five known asteroids that would be excellent candidates that will pass by Earth before 2100. The trip would only be one way, because there isn't an asteroid that would make a round trip feasible. However, new discoveries are being made all the time, so it's possible there's an asteroid that will head back towards Earth that we haven't discovered yet.

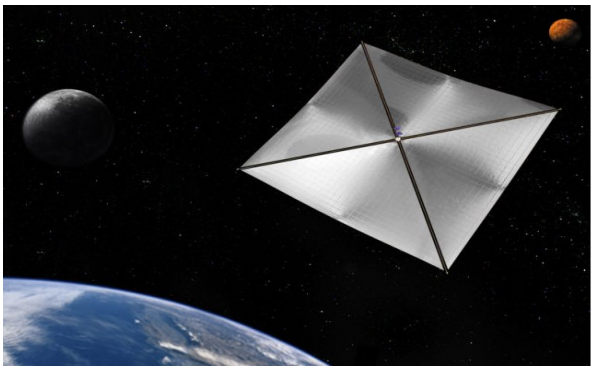
[P.T.O]

7.Solar Sail

While sails are low-tech by today's standards, they're getting a modern update in space travel. Instead of using wind, these sails would use the power of the sun. Solar sails would only give a spacecraft a small push, but since there's no friction in space the sails would continually build up speed. For example, a solar sail that's 1,300 feet wide could travel 1.3 billion miles per year. That's faster than a vessel using chemical propulsion. That would also be relatively cheap compared to fuel use.

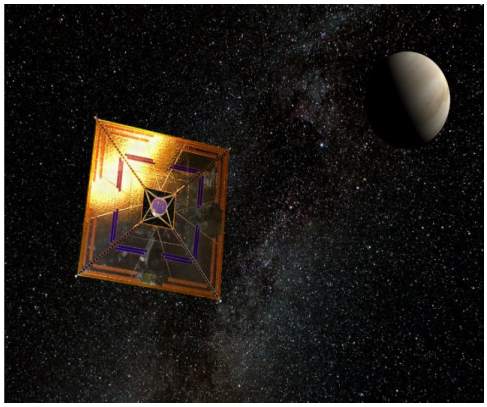
There are currently several projects using solar sails. One comes from NASA and is called the Sun jammer, after a short story by Arthur C. Clarke. The Sun jammer sail would be made from a material called Kapton and be just five microns (about 0.0002 inches) thick, weigh less than 70 pounds and be about the size of a dishwasher when packed up.

It's suggested that, while it make take a few centuries to develop, a solar sail could be used to carry a spacecraft into another solar system. This sail would need to be the size of Texas, and a strong laser would need to shine on it as it got further away from the sun.



8.Magnetic Sail

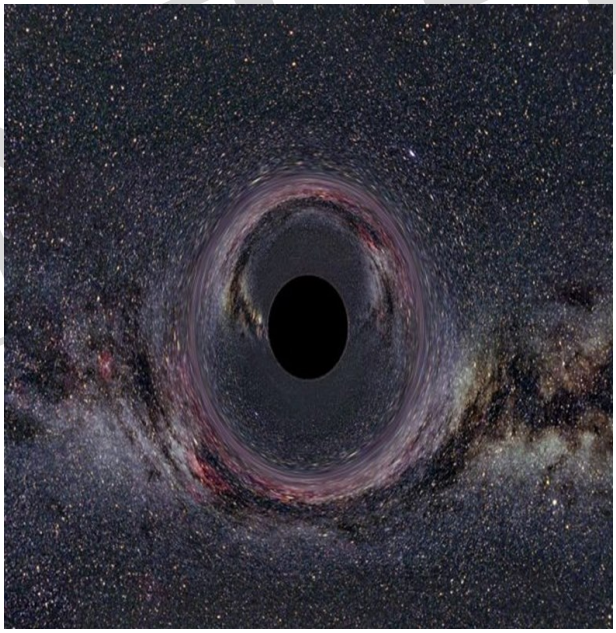
The sun releases mostly protons and electrons at speeds that range from 248 to 370 miles per millisecond. A magnetic sail would use this energy and push against it. A loop of conducting material would produce a magnetic field that's perpendicular to the solar wind, and this would push the craft to the desired location. The problem is that to do this, the sail would need to be 62 miles long. The technology to make the superconducting material for a sail of that size, and keep it at the right temperature, just isn't available right now. Magnetic sails are just a theory until better technology is developed.



9.Wormhole

A staple of science fiction, wormholes have fascinated people ever since they were first theorized in 1921. While they're believed to exist, there's no visible evidence. Wormholes are essentially tunnels in space, which objects could theoretically travel through. But wormholes are unstable — if someone were to travel through them, the walls would probably collapse.

To safely travel through, the craft would use an anti-gravitational force. Physicists say we most likely wouldn't be able to collect enough energy. If there was a wormhole humans could travel through, it wouldn't naturally occur; it would have to be constructed by an advanced civilization. So, until we either get to that point or someone constructs a wormhole for us, it will remain in the realm of science fiction.



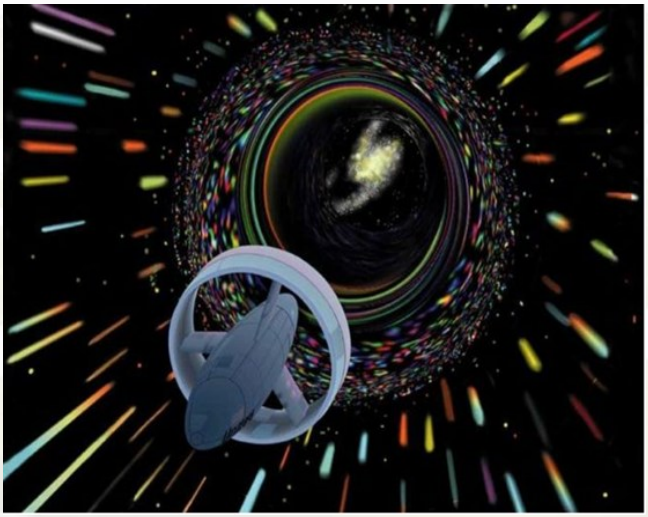
[P.T.O]

10.Warp Drive

Made popular by *Star Trek*, a warp drive allows for faster than light travel. It's often thought to be impossible because of the incredible amount of energy needed to run a drive. However, researchers believe that they've found a way. The first idea was to use a design by physicist Miguel Alcubierre, who proposed a spacecraft shaped like an American Football with a flat circular ring around it. But to power that design, you would need a ball of antimatter the size of Jupiter.

To make the spacecraft more feasible, NASA's Dr. Harold White tweaked the design. In theory, the modified ship would require much less antimatter, about 500 kilograms. The proposed spacecraft would warp space-time and reach speeds 10 times the speed of light. It would make trips to the closest star about four or five months long.

Unfortunately, antimatter is incredibly volatile. Just one third of a gram could release the same amount of energy that was released during the bombing of Hiroshima. The amount of antimatter that White's design needs would be the equivalent of 1.5 million Hiroshima's, enough to destroy the Earth.

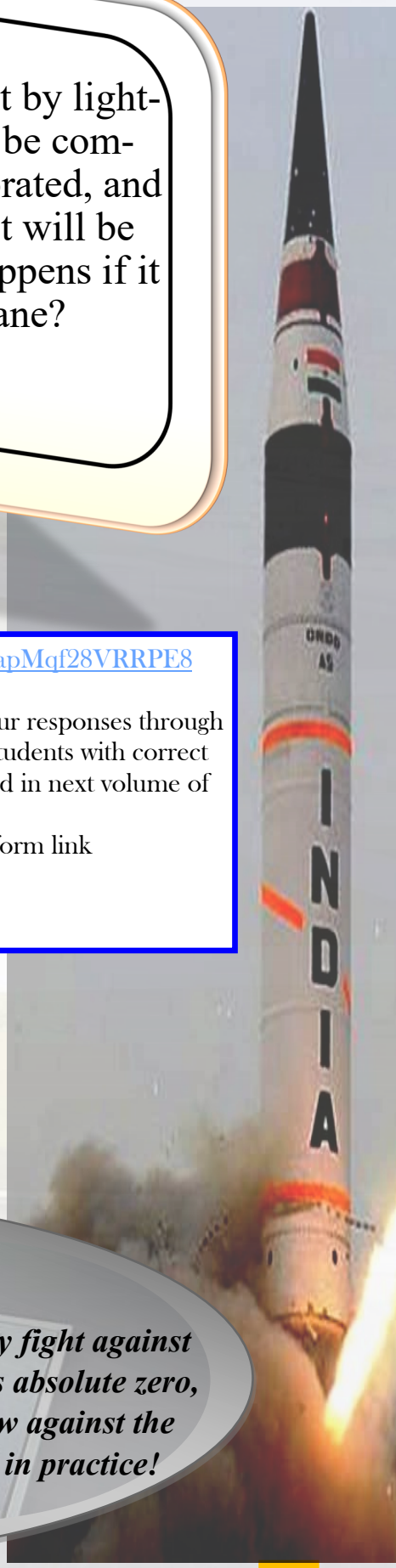


If a person hit by lightning, it can be completely evaporated, and nothing of it will be left. What happens if it is airplane?

https://forms.gle/XNkHapMqf28VRRPE8

You people can send your responses through the given link. First 10 Students with correct responses will be featured in next volume of our Magazine

1. Click on the google form link
2. Send your answer.



DID YOU KNOW?

Helium is one of the only known elements to actively fight against gravity. By cooling the gas down to what is known as absolute zero, helium turns into a liquid. This liquid will then flow against the natural force of gravity – it's really strange to see in practice!

ORION NEBULLA

Kanigiri Roshini
20761A5620

The Orion Nebula (also known as Messier 42, M42, or NGC 1976) is a diffuse nebula situated in the Milky Way, being south of Orion's Belt in the constellation of Orion. Before going to know about the this Orion Nebula let us know **what is ORION?**

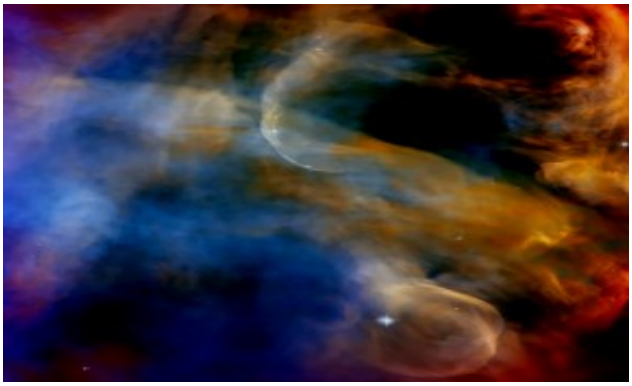
Orion is a prominent constellation located on the celestial equator and visible throughout the world. It is one of the most conspicuous and recognizable constellations in the night sky. It is named after Orion, a hunter in Greek mythology. Its brightest stars are blue-white Rigel .

It is one of the brightest nebulae and is the closest region of massive star formation to Earth. The M42 nebula is estimated to be 24 light-years across. It has a mass of about 2,000 times that of the Sun.

The Orion Nebula is visible with the naked eye even from areas affected by some light pollution. It is seen as the middle "star" in the "sword" of Orion, which are the three stars located south of Orion's Belt. The "star" appears fuzzy to sharp-eyed observers, and the nebulosity is obvious through binoculars or a small telescope.

The peak surface brightness of the central region of M42 is about 17 Mag/arcsec^2 and the outer bluish glow has a peak surface brightness of 21.3 Mag/arcsec^2 .It contains a very young open cluster, known as the Trapezium Cluster due to the asterism of its primary four stars within a diameter of 1.5 light years. The stars of the Trapezium Cluster, along with many other stars, are still in their early years. The Trapezium Cluster is a component of the much larger Orion Nebula, an association of about 2,800 stars within a diameter of 20 light years.

The first discovery of the diffuse nebulous nature of the Orion Nebula is generally credited to French astronomer Nicolas-Claude Fabri de Peiresc , on November 26, 1610, when he made a record of observing it with a refracting telescope



purchased by his patron Guillaume du Vair.

The first published observation of the nebula was by the Jesuit mathematician and astronomer johann Bapist Cysat of Lucerne in his 1619 monograph on the comets (describing observations of the nebula that may date back to 1611). He made comparisons between it and a bright comet seen in 1618 and described how the nebula appeared through his telescope as: one sees how in like manner some stars are compressed into a very narrow space and how round about and between the stars a white light like that of a white cloud is poured out.

చిన్ని పాదాలు కందకుండా
నా బాల్యం చెదరకుండా
చిరు నవ్వులు చేజారకుండా
ప్రతిక్షణం నీడలా
మనలోని ఆత్మలా
కలసి కలగలసి పోయి
మన జీవితం కోసం
తన జీవితం అర్పించేవాడు.
-"నాన్న"

Krishna Mohan
21761A5606

WORD SEARCH

L	R	E	M	O	T	E	S	O	C	I	A	L	L	H
V	E	L	O	C	I	T	Y	M	E	E	G	O	P	A
F	U	I	D	M	Y	B	U	L	L	E	T	V	L	E
I	S	U	N	D	A	R	P	I	C	H	A	I	R	R
N	A	M	B	I	N	A	R	A	Y	A	N	A	N	O
I	B	A	C	Y	R	H	O	R	V	S	G	S	O	F
F	L	H	F	Z	I	M	H	S	E	N	I	D	Z	O
M	E	E	N	A	M	O	I	T	H	A	R	U	Z	I
R	E	L	I	O	P	S	N	D	R	P	L	R	L	L
H	Y	S	P	U	T	N	I	K	A	I	R	G	E	L
G	Y	M	B	A	L	L	I	S	T	I	C	K	D	B
C	A	R	B	O	N	D	I	O	X	I	D	E	K	A
R	A	P	P	L	E	S	A	U	C	E	R	A	A	Z
J	U	P	I	T	E	R	I	A	E	R	O	G	E	L

QUESTIONS

1. In IIRS “R” is abbreviated as.
2. Mach number changes with speed of sound and_____
3. The smallest weapon that can travels with supersonic speed
4. CEO of alphabet and google.
5. Name of the Indian scientist who rectified fluid flow in liquid engines?
6. The control surface which is used to reduce speed of aircraft.
7. The world’s first satellite was launched by USSR which is named as _____
8. The type of missile which uses projectile motion to deliver warheads on a target
9. The lightest solid on the earth is ?
10. One of the problems facing future colonising of Mars is its atmosphere. It consists mainly of
11. Highest flight in a rocket flight called
12. First planet formed in our Solar system
13. RLV-TD abbreviated as R_____ Launch Vehicle-Technology Demonstrator "R" represents
14. Flow accelerating device is called____
15. First satellite launched by ISRO.
16. Indian missile that's claimed to be the fastest, collaborative project of Russia and India
17. The lateral cross section of wing turned out to be.
18. Human is a ____animal.
19. The most famous pieces of space junk are camera and _____
20. First food eaten in space

HOW TO ANSWER ?
https://forms.gle/FkuxUTzFKwfhivs57

You people can send your responses through the given link. First 10 Students with correct responses will be featured in next volume of our Magazine
1.Just answer the puzzle on a white paper, take a picture of it.
2.Click on the google form link.

DID YOU KNOW ?

The favorite food of astronauts is freeze-dried shrimp cocktail

LATEST HAPPENINGS

ONE WEB INDIA-1 MISSION

B. Kusuma
20761A5606.

Oneweb/ LVM3-M2 confirmed the successful deployment of 36 satellites launched by NewSpace India Limited (NSIL), from the Satish Dhawan Space Centre (SDSC- SHAR) in Sriharikota, India. This launch by ISRO and NSIL is one of the biggest commercial orders by India's premier space organization, and the first using the LVM3 rocket.

The lift-off took place on Sunday, 23rd October

2022 at 00.07hrs local time,the Bengaluru-headquartered Indian Space Research Organization (ISRO) . OneWeb's satellites separated successfully from the rocket and were dispensed in nine phases over a period of 1 hour and 15 minutes, with signal acquisition on all 36 satellites confirmed.

All 36 satellites are operational, bringing OneWeb's total Gen 1 LEO constellation to 462 satellites. Launch 14 from the Satish Dhawan Space Centre SDSC-SHAR, Sriharikota, India marks the first dedicated commercial launch for NewSpace India Limited (NSIL) using the LVM3 rocket. With this successful launch, the LVM3 has become a catalyst for the Indian Space Programme, opening new vistas for heavy payloads to the LEO. LVM3 was earlier called GSLV Mk III.LVM3-M2 is a three-stage launch vehicle consisting of two solid propellant S200 strap-ons on its sides and core stage comprising L110 liquid stage and C25 cryogenic stage.

The newest rocket is capable of launching a four tonne class of satellite to Geosynchronous Transfer orbit.

"In the coming days integration of (the) cryogenic upper stage of the launch vehicle and integration of payload fairing with 36 satellites will take place," NSIL had added.ISRO mentioned that It is the first LVM3-dedicated commercial launch on demand through NSIL .

This contract with M/s OneWeb is a historic milestone for NSIL and ISRO.LVM3 is a three-stage vehicle with two solid motor strap-ones, a liquid propellant core stage and a cryogenic stage. India's Bharti Enterprises is a major investor and shareholder in OneWeb.

The satellites are a part of the 468 satellite constellation of OneWeb released into Leo Earth Orbit to provide Internet access to areas which are

impossible to provide. OneWeb had penned a deal worth more than Rs 1000 crore for the launch and another GSLV launch carrying OneWeb payload is expected in January of 2023The sole reason behind changing the name of the vehicle from GSLV to LVM is that the rocket will not deploy the satellites in the geosynchronous orbit. The OneWeb satellites operate in Low Earth orbit (LEO) at an altitude of 1,200 kilometers. The geosynchronous orbit, on the other hand, is located 35,786 kilometers above Earth's equator. ISRO'sheaviest vehicle, LMV3,is also dubbed as one of the heaviest for its ability to carry satellites up to 8,000 kg.

Events held in Department of Aerospace Engineering

LAKIREDDY BALIREDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
L. B. REDDY NAGAR, MYLAVARAM-521230, N.T.R. DISTRICT, ANDHRA PRADESH
AFFILIATED TO JNTUK, KAKINADA APPROVED BY AICTE NEW DELHI
ACCREDITED BY NAAC WITH "A" GRADE, AN ISO 9001:2015 CERTIFIED INSTITUTION

DEPARTMENT OF AEROSPACE ENGINEERING & NSS UNIT

On the occasion of Birth Anniversary of Missile Man Of India, **DR. A. P. J.ABDUL KALAM,**
Department of Aerospace & NSS Unit
are commonly organizing the following events on 14/10/2022 (friday).

Events

Essay writing (Maximum 200 Words)
Topics :
- Biography of Dr. A. P. J. Abdul Kalam
- Achievements and Honors of Dr. A. P. J. Abdul Kalam

Time & Venue :
- 11.50 AM TO 12.30 PM
- 3502 (Block - III)

Student coordinators :
R. Nagarjuna (7780177562)
M. Durga Bhaskar (93926 46552)

convener :
Dr. P. Lovaraju

PPT Presentation (Maximum 10 minutes)
Topics :
- Indian Rocket Technology
- Indian Space Technology
- Indian Missile Technology

Time & Venue :
- 3. 10 PM
- 3504 (Block - III)

Faculty coordinator :
Dr.Sreenadh Chevula (83676 08134)

Co-Convener :
Dr. B. Siva Hari Prasad

DEPARTMENT OF AEROSPACE ENGINEERING

PLACEBO EFFECT

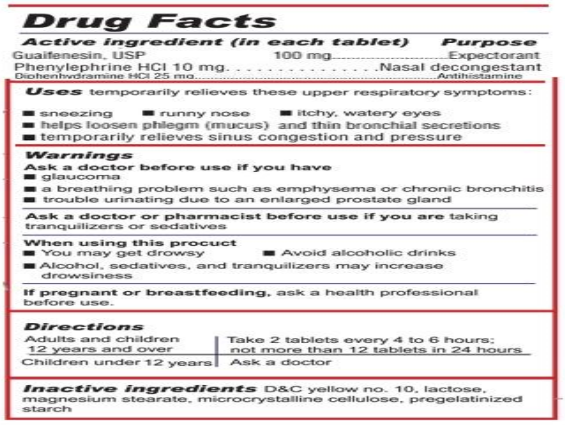
U. Sai Sanjay Vardhan

21761A5645

Have you ever heard about Joe Dispenza , the man who cured his crucial spine problem himself which was even gaveup by doctors. Did Joe have any superpowers or did he know any other medications which the doctors don't? What mad him to get rid of his spine problem?

Does our brain has a role in treating our health?

The answer is YES. It plays a major role in healing our health issues . When we take medicine our brain releases hormones which take part in the medication . The medicine we take will generally have active ingredient and inactive ingredient .Active ingredient is the real medicine andinactive ingredient is that which is added to get shape, colour and taste for medicine .The medicines which are made of only inactive ingredient is called Placebo which does not any qualities of



Drug Facts

Active ingredient (in each tablet) **Purpose**
Guaifenesin, USP 100 mg ..... Expectorant
Phenylephrine HCl 10 mg. . . . . .Nasal decongestant
Dichenhydramine HCl 25 mg ..... Antihistamine

Uses temporarily relieves these upper respiratory symptoms:
- sneezing
- runny nose
- itchy, watery eyes
- helps loosen phlegm (mucus) and thin bronchial secretions
- temporarily relieves sinus congestion and pressure

Warnings
Ask a doctor before use if you have
- glaucoma
- a breathing problem such as emphysema or chronic bronchitis
- trouble urinating due to an enlarged prostate gland

Ask a doctor or pharmacist before use if you are taking tranquilizers or sedatives

When using this procuct
- You may get drowsy
- Avoid alcoholic drinks
- Alcohol, sedatives, and tranquilizers may increase drowsiness

If pregnant or breastfeeding, ask a health professional before use.

Directions

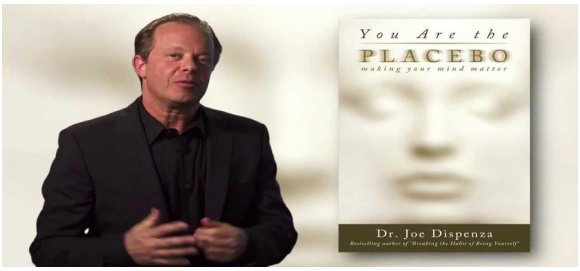
Adults and children 12 years and over	Take 2 tablets every 4 to 6 hours; not more than 12 tablets in 24 hours
Children under 12 years	Ask a doctor

Inactive ingredients D&C yellow no. 10, lactose, magnesium stearate, microcrystalline cellulose, pregelatinized starch

treating our health issues. The researchers discovered that the placebo was 50% as effective as the real drug. Not only about medicines , this effects plays a major role in crucial surgeries too. Placebo effect is nothing but believe system. When we strongly believe that we'll be cured , we will. When we start to believe , our brain releases the hormones which cures us. The institute of Noetic Sciences collected the of 3500+ patients reports who are treated with placebo effect . Many of them are with heart problems , kidney failure ,B.P, HIV ,cancer and many more.

Many experiments were conducted on this and one of them was- a group of six patients whose are suffering from headache were separated into two groups. Both the groups were given some placebo pills .For the first group, it was said that their headache will be cured and for the other group it was said that the headache will be cured and fall into deep sleep. The result was the first group was cured as the second but additionally the patients of second group fall into deep sleep. Here they strongly believed what was said to them , so their brains started to think about what was said and worked for it.

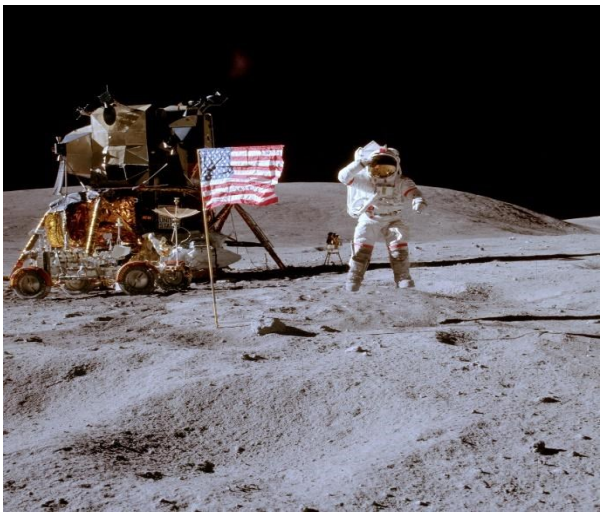
In the time of second world war, most of the soldiers were injured heavily. There isn't enough Morphine for the soldiers. But without morphine, the soldiers can't be cured. The American doctor, Henry Beecher had an idea of injecting normal saline water instead of morphine. Surprisingly, the pain of soldiers was reduced. This is because of the placebo effect, the soldiers believed that they were given morphine which would reduce their pain. As they believed their brain worked for it , so their pain was reduced. Here saline water is placebo. Coming back to Joe, when he was in a bicycle race he was hit by a car with a speed of 80kmph. His spine was effected and his doctors said he need Harrington rod surgery but he won't be walk again. But Joe did not accept this. Joe believe that our brain has the power of healing our health issues . Many days he sat alone in his wheelchair and imagine that his spine problem is getting to normal state. After few days he could move his body. After ten weeks he could stand and after twelve weeks he could walk. He believed that he'll be normal and his brain worked for it, the rest is he is back to his normal life. He wrote a book – You are the Placebo , to expose the world about this effect.



When we strongly believe about something, our brain works for it and make changes in our body. That is why we are mostly said to be positive, when we have enough positivity we could over come our problems. Our brain itself have the healing mechanism and can help us to get rid of health issues getting severe. It's important to be confident and positivity to lead good life.

APOLLO MOON FLAGS STILL STANDING

Kalisetty Bhanu Prakash
20761A5619



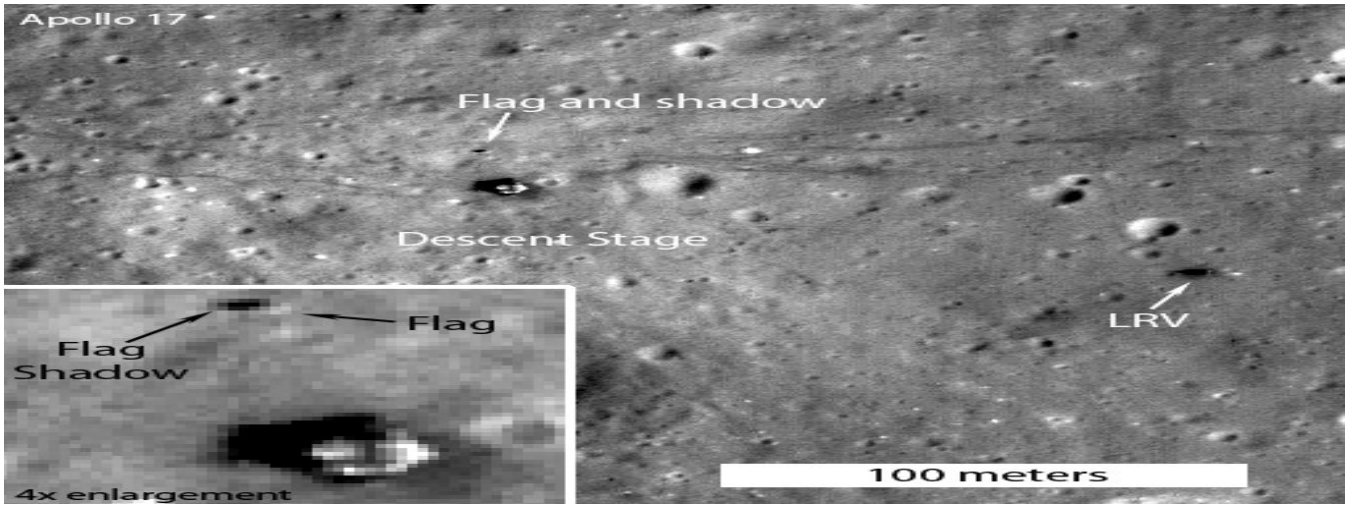
LRO was designed to produce the most detailed maps yet of the lunar surface. Not only did the spacecraft image the Apollo sites, but it captured details like the Lunar Module descent stages, rover tracks, flags.

Images taken by the Lunar Reconnaissance Orbiter (LRO) have shown that the American flags left on the Moon by Apollo astronauts are still standing– except for the Apollo 11 mission, which Buzz Aldrin reported as being knocked over by engine exhaust as Apollo 11 lifted off.

Each of the Apollo missions to the Moon planted an American flag in the soil. By studying photos of the Apollo landing sites taken at different times during the day, scientists observe circling the points where the flags are thought to be.

"From the LROC images it is now certain that the American flags are still standing and casting shadows at all of the sites, except Apollo 11," writes Mark Robinson, chief scientist for the LROC camera. "Personally I was a bit surprised that the flags survived the harsh ultraviolet light and temperatures of the lunar surface, but they did. What they look like is another question." The flags may in fact be badly faded.

LRO slewed 19° down-Sun allowing the illuminated side of the still standing American flag to be captured at the Apollo 17 landing site.



NO ONE CAN JUDGE YOU,
NO ONE CAN GUIDE YOU,
NO ONE CAN MOTIVATE YOU,
NO ONE CAN CHANGE YOU ,
UNLESS YOU GIVE A CHANCE.

-KANULLA DINESH BABU
20761A5621

3D Bio-printing

MARAM MAHENDRA REDDY
20761A5631

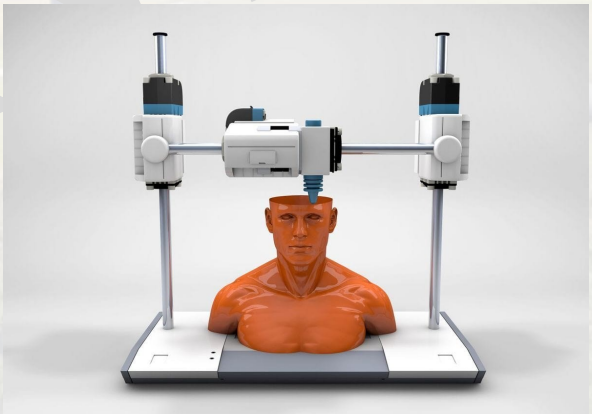
The field of Tissue engineering and regenerative medicine that work toward creating functional tissue-constructs mimicking native tissue for repair and/or replacement of damaged tissues or whole organs have evolved rapidly over the past few decades. However, traditional tissue engineering approaches comprising of scaffolds, growth factors and cells showed limited success in fabrication of complex 3D shapes and in vivo organ regeneration leading to their non-feasibility for clinical applications from a logistical and economical viewpoint. In this regard, 3D bioprinting, which is an extended application of additive manufacturing is now being explored for tissue engineering and regenerative medicine as it involves the top-down approach of building the complex tissue in a layer by layer fashion, thereby producing precise geometries due to controlled nature of matter deposition with the help of anatomically accurate 3D models of the tissue generated by computer graphics. Here, we aim to provide a comprehensive review of the 3D bioprinting technology along with associated 3D bioprinting strategies including ink-jet printing, extrusion printing, stereolithography and laser assisted bioprinting techniques. We then focus on the applications of 3D bioprinting technology on con-

struction of various representative tissue and organs, including skin, cardiac, bone and cartilage etc.

3D bioprinting has emerged as a promising new approach for fabricating complex biological constructs in the field of tissue engineering and regenerative medicine. It aims to alleviate the hurdles of conventional tissue engineering methods by precise and controlled layer-by-layer assembly of biomaterials in a desired 3D pattern. The 3D bioprinting of cells, tissues, and organs Collection at Scientific Reports brings together a myriad of studies portraying the capabilities of different bioprinting modalities. This Collection amalgamates research aimed at 3D bioprinting organs for fulfilling demands of organ shortage, cell patterning for better tissue fabrication, and building better disease models.

The discovery of a 3D printer dates back to early 1980s when Charles Hull, an American engineer, built the 1st 3D printer, capable of creating solid objects by following a computer-aided design (CAD). The printer deposited successive layers of an acrylic-based photopolymer which was then simultaneously crosslinked by UV light, thus creating a solid 3D object. This simple technology, called stereolithography (SLA), revolutionized the additive manufacturing industry. Gradually, by the late 1990s, 3D printing made its appearance in healthcare where surgeons began 3D printing dental implants, custom prosthetics, and kidney bladders. Subsequently the term '3D bioprinting' emerged where the material being
printed, called 'bioink'1, consisted of living cells, biomaterials, or active biomolecules. Analogous to additive manufacturing, 3D bioprinting involves layer-by-layer deposition of bionic to create 3D structures, such as tissues and organs.

3D bioprinting can be broadly categorized as either extrusion3, droplet4, or laser-based bioprinting. Extrusion based bioprinting employs mechanical, pneumatic or solenoid dispenser systems to deposit bioinks in a continuous form of filaments, while droplet based bioprinting relies on the generation of bioink droplets by thermal, acoustic or electrical stimulation. Laser based bioprinting utilizes laser power to 3D print structures

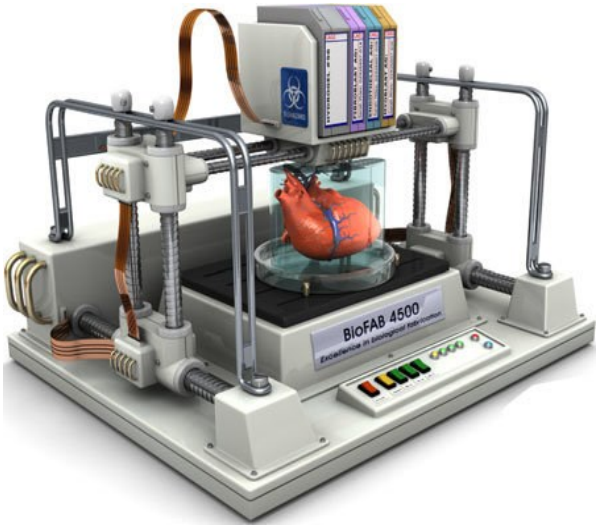


such as in SLA by a photopolymerization principle.

[P.T.O]

It can also be used for precise positioning of cells such as in laser direct-write and Laser Induced Forward Transfer (LIFT). The selection of "bioinks" for each of these different bioprinting modalities usually varies based on the ink's rheology, viscosity, crosslinking chemistry, and biocompatibility Apart from organ printing, bioprinting is also being used to fabricate in-vitro tissue models for drug screening, disease modelling, and several other in-vitro applications.

The 3D bioprinting of cells, tissues and organs Collection at Scientific Reports is dedicated to this field of research. This collection clearly portrays the diverse applications of different bioprinting modalities and



how they could be utilized for improving various aspects of healthcare.

The bioprinting enables the homogenous distribution of cells representing the macro-architectural properties, it lacks control of the tissue micro-architecture such as orientation of cells within the bioprinted constructs.

It is important to note that the applications of 3D bioprinting are not limited to organ printing. It also holds great promise in less explored avenues, such as using scaffolds for drug delivery, studying disease mechanisms, or creating personalized medicines.

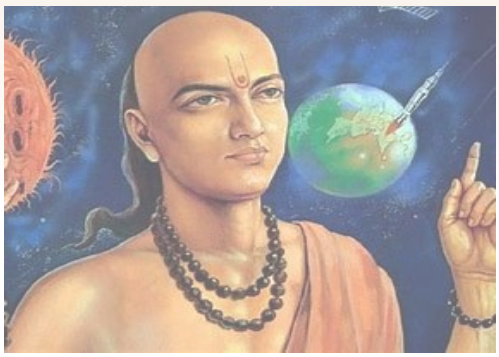
Even though 3D bioprinting is advancing at a commendable rate with researchers trying to develop new printing modalities as well as improve existing modalities, there still remains a multitude of challenges that need to be overcome. Currently, a limited number of bioinks exist which are both bioprintable and which accurately represent the tissue architecture needed to restore organ function post-printing. While bioinks made from naturally derived hydrogels are conducive to cell growth, synthetic hydrogels are mechanically robust. Overall, 3D bioprinting is a rapidly evolving field of research with immense challenges, but tremendous potential to revolutionize modern medicine and healthcare.

References

Hospodiuk, M., Dey, M., Sosnoski, D. & Ozbolat, I. T. The bioink: a comprehensive review on bioprintable materials. Biotechnol. Adv. 35, 217–239 (2017)

INDIA'S CONTIBUTIONS TO THE WORLD

- **India never invaded any country in her last 10000 years of history.**
- **India invented Number System. Zero was invented by Aryabhatta.**
- **Sanskrit is the mother of all European languages.**
- **The art of Navigation was born in the river Sindh 6000 years ago.**
- **Chess (Shataranja or AshtaPada) was invented in India.**
- **The place value system, the decimal value system was developed in India in 100BC.**



STUDENT ACHIEVEMENTS

ON THE EVE OF TELUGU BHASHA DINOTSAVAM :

P.DHARANI (20761A5644)
2nd Prize in ESSAY WRITING

M.SOWJANYA (20761A5634)
3rd Prize in ELOCUTION

ON THE EVE OF ENGINEERS DAY:

Winners of "CREATIVE MINDS" contest:

1st Prize-D.NAVEEN(20761A5614)
N.RAMANJANEYULU(20761A5635)
2nd Prize– NITYA PRIYA(21761A5640)

ON THE EVE OF 91ST BIRTH ANNIVERSARY OF DR.A.P.J.ABDUL KALAM:

N.MEENA MAHITHA(20761A5638)
2nd prize in PRESENTATION

M.CHAITANYA GREESHMA(21761A5623)
2nd Prize in ESSAY WRITING

ACHIEVEMENTS IN NCC:

Certified as 'GRADE-B' Cadets and completed Annual Training Camp-1:

- **N.Deepthi Naga Sneha(19761A5622)**
- **B.Kusuma(20761A5606)**
- **K.Roshini (20761A5620)**
- **SK.Sayada Shaniya (20761A5648)**
- **D.Siri Chandana (20761A5610) completed ATC –1only.**

ON THE EVE OF MECHXROM-2K22 (INV.R.SIDDHARTHA ENGINEERING COLLEGE)

1st Prize in "LOGO MONIA"

- **B. Siva Koti Reddy(20761A5607)**
- **P. Jaya Kishore Reddy (20761A5641)**
- **P. Balaji Kereeti(20761A5642)**

2nd Prize in "CAD DIMENSIONS"

- **P. Harsha Vardhan (21765A5606)**

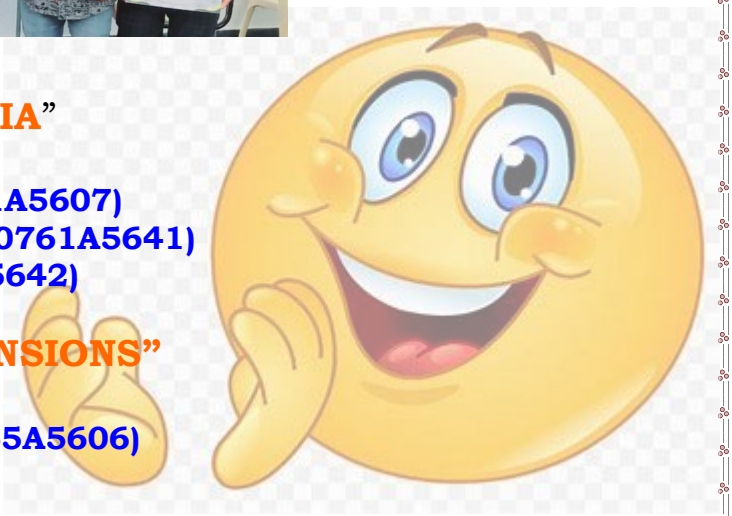
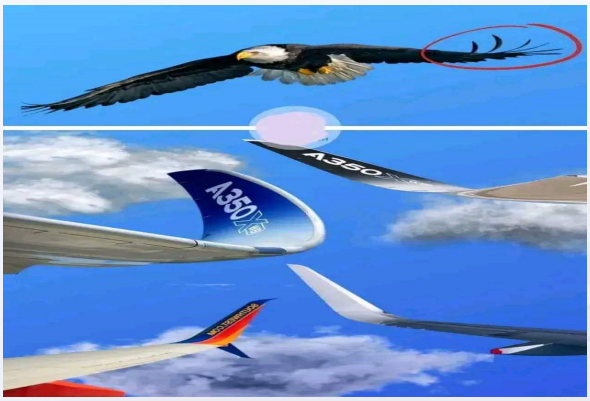
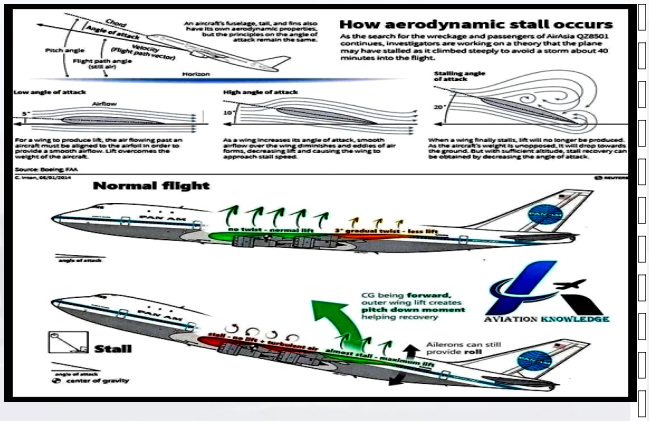
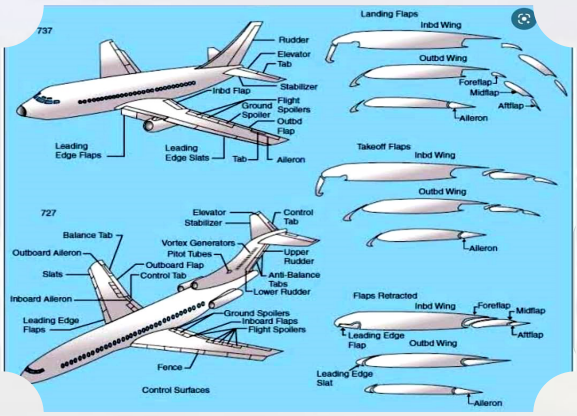
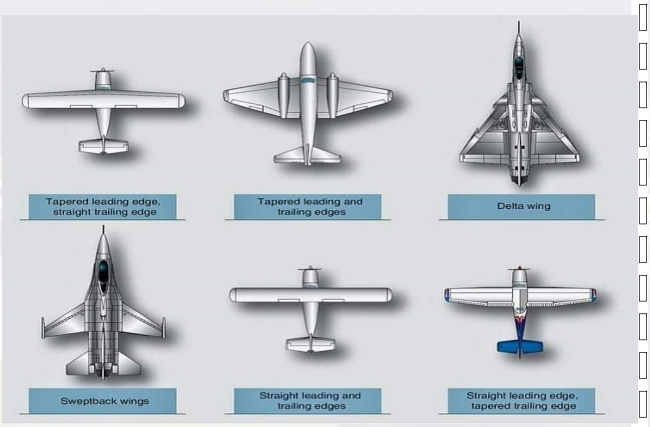


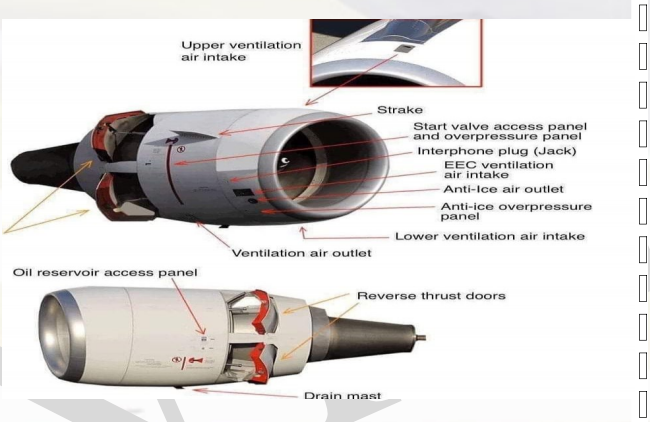
PHOTO GALLERY

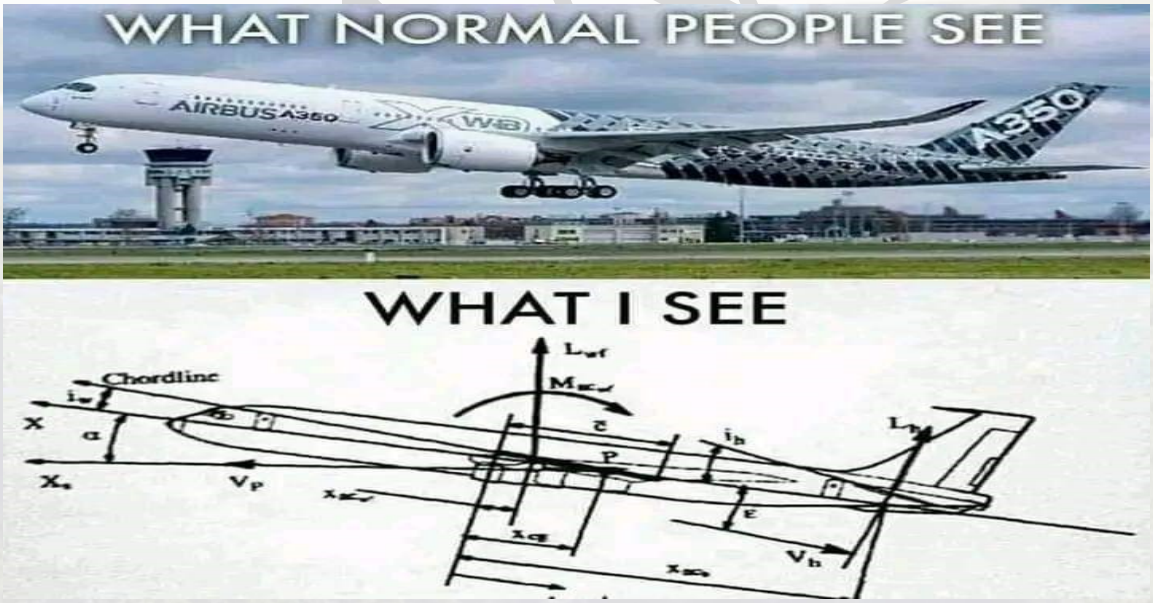












ANTHARIKSH

THE SPACE...

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