JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

UNIVERSITY COLLEGE OF ENGINEERING, VIZIANAGARAM

DEPARTMENT OF

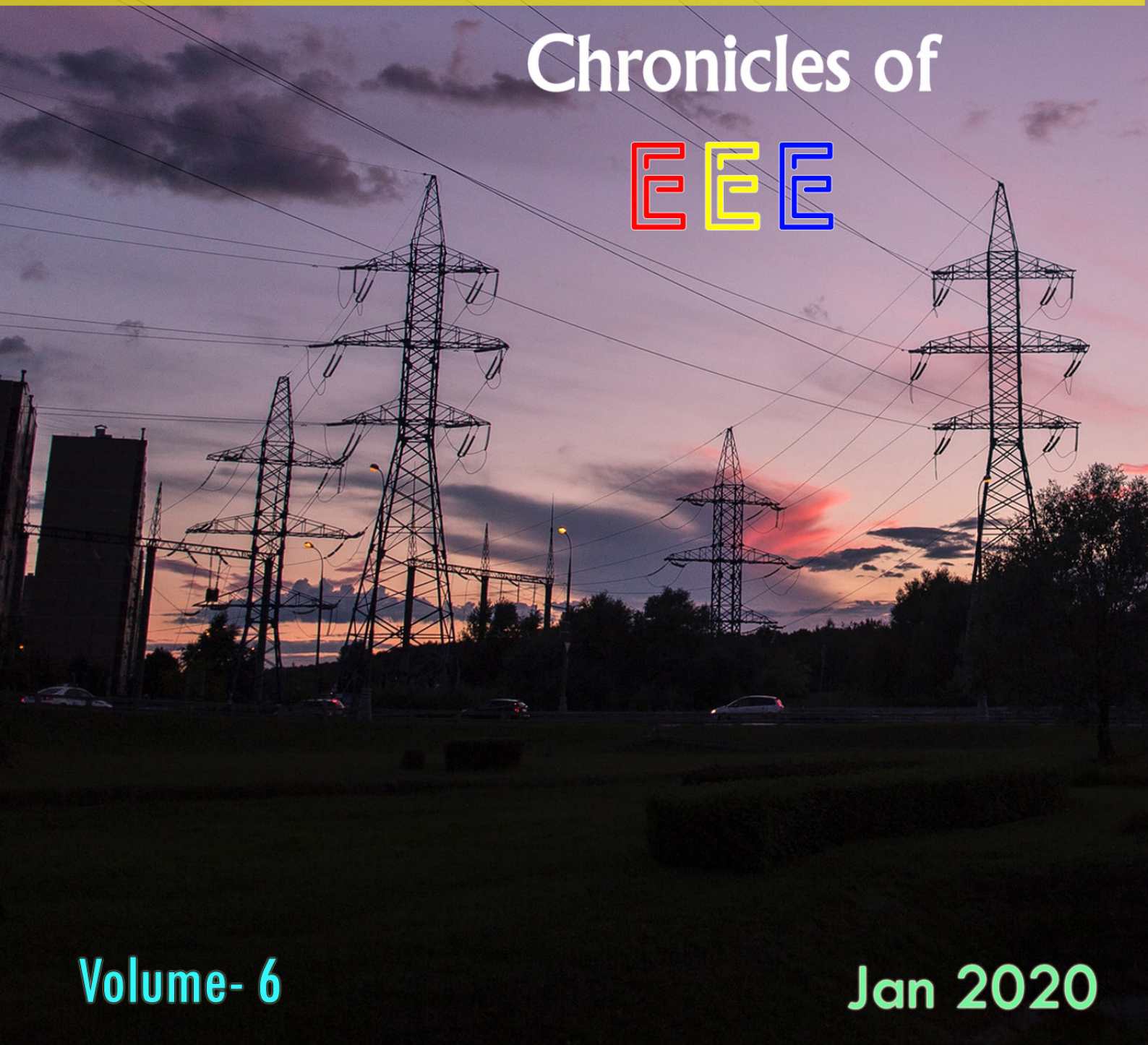
ELECTRICAL AND ELECTRONICS ENGINEERNG

presents

THE MEMOIR

Chronicles of

EEE



Volume- 6

Jan 2020


ROAD
SAFETY
INDIA

MOTTO OF MAGAZINE

We take immense pleasure to thank all the readers our magazine for your support to our effort. We, depertment of Electrical and Electronics Engineering proudly presents the sixth edition of our magazine **"THE MEMOIR- chronicles of EEE".**

We would like to take this opportunity to thank our Principal, **Dr.G.SwamiNaidu,** and all our faculty of Electrical and Electronics Engineering depertment and our fellow students for their support in developing our magazine. **Smt. A.Padmaja**, our head of depertment, who was continuosly catalysing students of various years to collaborate among themselves to get the best output. We would like to extend a special thanks to Dr.V.S. Vakula for her approachability and constant support, Smt. S. Rajitha for her coordination. We also thank all teaching staff for their support.

This edition is gathering of recent advancements in the field of electrical and electronics like Future technologies, Inspiring minds, inventors and their inventions and so on. The general topics like Universe, Next generation of power electronics were also included. The main moto is to make the readers aware of recent advancements and in ELECTRICAL field and make them to know about the future world of technologies.

Once again, we would like to express our considerable appreciation to all authors of articles and their knowledge in carving **"THE MEMOIR-chronicles of EEE".** We welcome your valuable suggestion to improve the standard of our magazine.

THANK YOU
-Magazine team

PRINCIPAL'S MESSAGE

Dr. G. Swami Naidu

" It is a noble task on the part of the Department of Electrical & Electronics Engineering to once again make it with the frequent sixth edition of their technical magazine 'THE MEMOIR'. I wish that this excellent work establishes to be a flint to fire the enthusiasm and excite their minds for many intrusive innovations among the students and inspire passion among the members of the faculty of Electrical and Electronics committee. I truly wish them all the success."

H.O.D's MESSAGE

Smt. A. Padmaja

"I am extremely delighted to note that the student community of Dept. of Electrical & Electronics Engineering, JNTUK-UCEV in bringing out sixth edition,'THE MEMOIR'. I wish them all the success.

I express my compliments to faculty, the editors and their dedicated committee for their valuable efforts in bringing out this magazine. I wish them all triumph!"

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MESSAGE OF MAGAZINE

Road traffic safety refers to the methods and measures used to prevent road users from being killed or seriously injured. Typical road users include pedestrians, cyclists, motorists, vehicle passengers, horse riders, and passengers of on-road public transport (mainly buses and trams).

The basic strategy of a Safe System approach is to ensure that in the event of a crash, the impact energies remain below the threshold likely to produce either death or serious injury. This threshold will vary from crash scenario to crash scenario, depending upon the level of protection offered to the road users involved. For example, the chances of survival for an unprotected pedestrian hit by a vehicle diminish rapidly at speeds greater than 30 km/h, whereas for a properly restrained motor vehicle occupant the critical impact speed is 50 km/h (for side impact crashes) and 70 km/h (for head-on crashes).

As sustainable solutions for all classes of road safety have not been identified, particularly low-traffic rural and remote roads, a hierarchy of control should be applied, similar to classifications used to improve occupational safety and health. At the highest level is sustainable prevention of serious injury and death crashes, with sustainable requiring all key result areas to be considered. At the second level is real-time risk reduction, which involves providing users at severe risk with a specific warning to enable them to take mitigating action. The third level is about reducing the crash risk which involves applying the road-design standards and guidelines (such as from AASHTO), improving driver behavior and enforcement.

Road traffic crashes are one of the world's largest public health and injury prevention problems. The problem is all the more acute because the victims are overwhelmingly healthy before their crashes. According to the World Health Organization (WHO), more than 1 million people are killed on the world's roads each year.[3] A report published by the WHO in 2004 estimated that some 1.2 million people were killed and 50 million injured in traffic collisions on the roads around the world each year[4] and was the leading cause of death among children 10–19 years of age. The report also noted that the problem was most severe in developing countries and that simple prevention measures could halve the number of deaths.

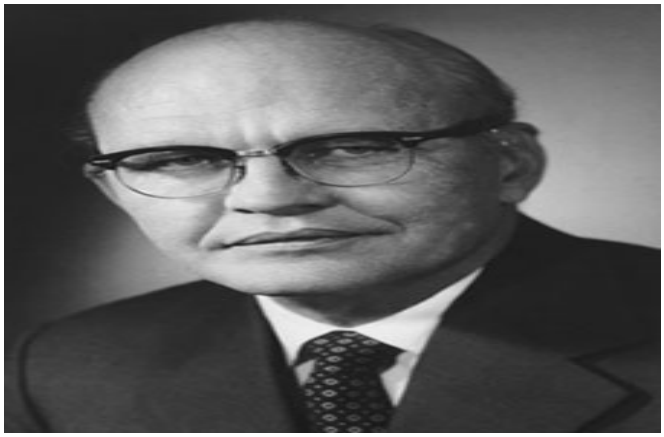
Safety can be improved in various simple ways to reduce the chance of a crash occurring. Avoiding rushing or standing in unsafe places on the bus or coach and following the rules on the bus or coach itself will greatly increase the safety of a person travelling by bus or coach. Various safety features can also be implemented into buses and coaches to improve safety including safety bars for people to hold onto.

The main ways to stay safe when travelling by bus or coach are as follows:

- Leave your location early so that you do not have to run to catch the bus or coach.
- At the bus stop, always follow the queue.
- Do not board or alight at a bus stop other than an official one.
- Never board or alight at a red light crossing or unauthorized bus stop.
- Board the bus only after it has come to a halt without rushing in or pushing others.
- Do not sit, stand or travel on the footboard of the bus.
- Do not put any part of your body outside a moving or a stationary bus.
- While in the bus, refrain from shouting or making noise as it can distract the driver.
- Always hold onto the handrail if standing in a moving bus, especially on sharp turns.
- Always adhere to the bus safety rules.

"STOP THINK ACT"

ABOUT A SCIENTIST



JACK KILBY

An American Electrical Engineer who took part in the realization of the first integrated circuit . He is also the co-inventor of hand-held calculator and thermal printer.

EARLY LIFE :

Jack St. Clair Kilby was born on 8 November, 1923, in Jefferson City, Missouri. In his early childhood he moved to Salina, and later to Great Bend, Kansas, where he spent most of his childhood. Jack grew up among the industrious descendents of the western settlers of the American Great Plains. His father was an electric engineer, who ran a small electric company—Kansas Power Company, that had customers scattered across the rural western part of Kansas. Jack's interest in electrical engineering was kindled in the winter of 1937, when his father used a ham radio to maintain contact with his power stations during a blizzard. Fascinated by radio, Kilby studied hard, soon gained his Federal Communications Commission license, and built his own radio using salvaged parts.

EDUCATION :

Throughout high school Kilby wanted to be an electrical engineer. After high school however, Kilby failed his entrance to the Massachusetts Institute of Technology. Ultimately, he enrolled at his parents' alma mater, the University of Illinois. Four months after his first semester began, the American naval base at Pearl Harbor was attacked. Kilby enlisted in the U.S. Army Signal Corps and later served with the Office of Strategic Services. At the time, small groups of Allied soldiers were being airlifted into remote places to build resistance units. These soldiers were given backpack radios to communicate with their commanders. Although they represented the state of the art in radio technology, the radios were heavy and performed erratically; they had not been designed for jungle combat. In his attempt to remedy the situation, Kilby traveled to Calcutta for a truckload of black-market radio parts, and soon his unit was building smaller, more reliable radios for the troops. From this experience Kilby learned that if a machine does not quite meet certain needs, it can be rebuilt to do so.

After demobilization, Kilby returned to the University of Illinois, where he studied electrical engineering, and received the B.S. degree in Electrical Engineering in 1947 and then a M.S.

degree from the University of Wisconsin in 1950.

CAREER :

After receiving his master de-

gree, he started as an employee of Centralab Division of Globe Union Inc., that made parts for radios, televisions and hearing aids, from 1947 to 1958, where he was engaged in the design and development of semiconductor devices with ceramic- based, silk-screened circuits. In 1952 BellLaboratories announced that it would sponsor seminars on its new transistors and issue production licenses. Eager to get into the transistor business, Centralab paid the fee and sent Kilby to the seminar. He had already been immersed in the field for several years, and his mind was soon occupied by the possibilities of a device that would eliminate vacuum tubes, which were large, hot, and consumed a great deal of power. He quickly learned, however, that transistorized circuits had limitations that prevented engineers from actually being able to build the circuits they designed. Kilby was determined to overcome this challenge, but to do so he needed more resources than were available to him at Centralab. In 1958, together with his wife, Kilby moved to Dallas, Texas, when he took job with Texas Instruments. TI was the only company that agreed to let him work on electronic component miniaturization more or less full time, and it turned out to be a great fit. In June 1958 Kilby started as engineer and immediately proved his extraordinary constructor talent, proposing the first integrated circuit. He also worked on teams that invented the first handheld calculator and the first thermal printer, which was used in portable data terminals.

In 1970 he took a leave of absence from TI to do some independent work. While on leave, one of the things he worked on was how to apply silicon technology to help generate electrical power from sunlight. From 1978 to 1984, he spent much of his time as a Distinguished Professor of Electrical Engineering at Texas A&M University. He officially retired from TI in the 1980s.

AWARDS AND HONOURS :

- Jack Kilby receiving his Nobel Prize from the King Carl XVI Gustaf of Sweden at the Stockholm Concert Hall.
- Kilby had been honored to receive awards such as the National Medal of Science, was inducted into the National Inventors Hall of Fame, the Franklin Institute's Stuart Ballentine Medal and many others.

- Receiving the Nobel Prize in Physics in 2000 was a completely unexpected, yet very pleasant surprise for Kilby.

Kilby was a very gently and noble person, something rather rare in the community of inventors. Kilby holds more than fifty U.S. patents, besides the patents covering the monolithic integrated circuit.

HOBBIES :

Kilby's hobbies were reading, woodworking and photography. He had two daughters and five granddaughters.

DEATH :

Jack Kilby died on June 20, 2005, when he was 81, in Dallas, Texas, following a brief battle with cancer.

COURTESY : www.britannica.com

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WHAT IF WE POWERED THE PLANET WITH LIGHTNING

Every time you watch a thunderstorm outside your window, you're witnessing the energy of an atomic bomb. Now imagine harvesting that raw energy and using it to power the planet.

But how is lightning created? Would you have your own lighting collector? Why aren't we currently doing it?

Let's say, like solar panels, you could install a small lightning harvester in your backyard. It might be ugly, but pretty soon you'd be jumping for joy every time there's a lightning storm. Electricity is the set of physical phenomena associated with the presence and motion of matter that has a property of electric charge. It is simply said as a source of energy which became a commodity for this generation humans. It can also be depicted as the greatest gift of science to mankind.

Needs:

Electricity can be generated in many ways by thermal, hydro, wind and nuclear power plants. But there is an alternative way where we can produce electricity from one of the greatest natural phenomenon "Thunderstorms". All you need is a single bolt of lighting and you could power your house for a whole month.The would be a shocking savings on your electricity bill.

BUT HOW WOULD WE POWER THE WHOLE WORLD?

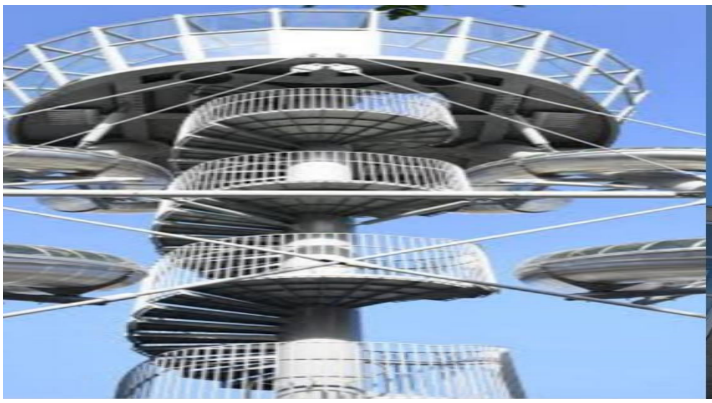
First, we'd install massive metal towers at some of lightning's highly visited areas. Luring it to our intended targets.Imagine monolithic towers rising from Lake Maracaibo in Venezuela. This lake is the most electric place on Earth, and during the peak rainy season, it's possible to see an average of 28 lightning flashes every minute.

We'd also install a lightning harvester next to Santis Tower in the Swiss Alps. This cell tower gets hit by lightning about 100 times a year, winning the title for most frequently struck.

If all 100 bolts of lightning were collected at Santis Tower, that would be 1,000 million to 100 billion volts of electricity every year. Still, we couldn't just rely on these electric hotspots.

It would largely depend on you, the average person, to harvest lightning for electricity. Much like solar panels, homeowners would elect to install lightning towers in their backyards or on top of their houses. Keeping the source close to where it's needed. There would also be small lightning farms scattered around rural areas, much like wind farms today. These large metal structures would be an eyesore on a normal day, but would be magnificent during a storm.

The countries where lightning strikes the most, the United States, India, and Colombia to name a few, would become the centers for lightning harvesting.



After using this clean energy to power their own countries, they would sell off the rest of the energy to other nations.

But how is lightning created in the first place?

Thunderclouds are made up of millions and millions of water droplets and ice which collide together. During all of those collisions, electrons are knocked loose and gather at the bottom of the clouds.This creates a negative charge in the lower part of a cloud while the upper cloud becomes positively charged. The separation of negative and positive charges results in an electrical field.

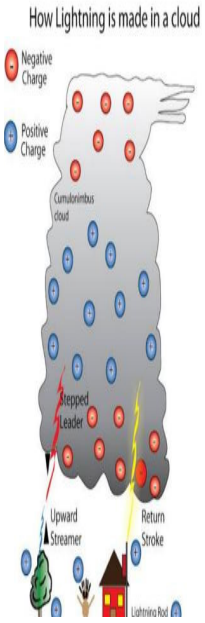
When this electrical field becomes strong enough, the surrounding air ionizes, creating positive and negative ions.

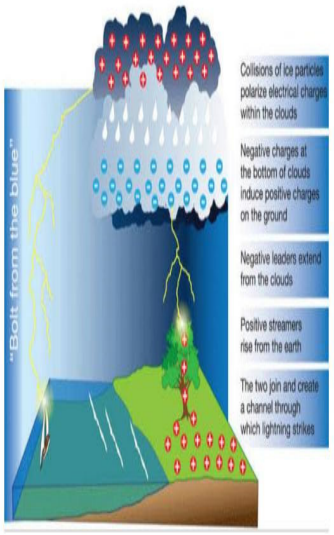
The negative ions create a path to Earth, called a step leader.

When the negative ions in a step leader find the positive ions of an object on the ground, let's say a lightning harvester, it strikes. And in this scenario, that energy is collected and stored for use.

But how close are we to developing this technology?

Well, not very close at all. In 2007, Alternative Energy Holdings designed a tower with grounding wires and a capacitor. But their attempts to harvest energy from lighting failed.The project was too costly and there were many limitations to its success. Lighting is, by nature, sporadic, so it isn't a sure thing that a bolt will hit a harvester during a storm.





If it does find its target, lighting disperses energy on its way down to Earth. So a tower would only capture a fraction of the energy from a lighting bolt.The bolts themselves are unpredictable and can range wildly from 100 million volts of energy to 1 billion volts of energy.

This would require a specially engineered collector that could withstand such a wide range without exploding and causing fires.Even if we were able to successfully harvest lightning and store the energy for future use, we'd only be able to power 8% of American homes. That's a far cry from powering the whole planet. But it's still clean energy and could be a piece of the entire renewable energy puzzle. If we really wanted to make lightning our sole source of energy, we'd need to figure out a way to control the weather. According to a survey in 2009, the world used around 20,279,640,000,000kWh – over 40 times the electrical energy that all the hypothetically harness-able land strikes contain. So, basically, all the lightning we can capture will give the world enough electricity for only nine days. So, we can use this as an alternative such in order to reduce the usage of thermal power plant which contributes a lot towards the pollution of earth's atmosphere.

DO YOU THINK ?

Most likely Ever thought .... What happens when a thunderstorm falls in sea . Don't the fish die due to the high voltage attack in the sea ?

COURTESY:
www.independent.co.uk

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INSPIRING MINDS

ELON MUSK

The most influential and forward-thinking tech leaders of our time, one of the names most likely to come up will be Elon Musk. The man behind revolutionary companies – founder, CEO, CTO and chief designer of SpaceX , CEO and product architect of Tesla,founder of The Boring Company; co-founder of Neuralink; and co-founder and initial co-chairman of OpenAI. He was elected a Fellow of the Royal Society (FRS) and also he was ranked 25th on the Forbes list of The World's Most Powerful People– has had an immense impact on the tech world and even on the future journey of mankind in a way . Elon Musk is a master of building and using innovation capital to win support for his ideas. Not only does he leverage his past success to win support for future projects, he also uses what we call "impression amplifiers" to get stakeholders on board.

SPACEX:

Space Exploration Technologies Corporation (SpaceX) is a space transport Services Company founded in 2002 .Elon musk believed that cheap reliable access to space was a market opportunity that could be exploited in the world. His vision was to build a simple and relatively inexpensive reusable rocket that would go into space multiple times. Elon Musk: "I believe $500 per pound ($1100/kg) or less is very achievable". He also stated that he wishes to make space travel available for "almost anyone".

From the start, Elon Musk has used SpaceX as a platform to advocate for space exploration and as a medium to instigate space exploration. CEO Elon Musk and other company leader's hope that one day SpaceX will take humans to Mars and beyond. Thus making our species a multi-planetary species, and guaranteeing our survival past catastrophic events on Earth.

TESLA:

One company stands out from the car maker mix, and that is Tesla Motors (TSLA). A 32-year-old Musk was inspired to build an entirely electric sports cars after test driving an electric car model called the tzero. It was officially incorporated in 2003 with the goal of inventing an electric car that was powerful and beautiful with zero emissions .This became the first publicly listed U.S. carmaker to hit the $100 billion mark.

It is less widely known that the car was named for Nikola Tesla, who is named as a giant of innovation because of his contributions in the fields of electricity, radio and robotics. Elon Musk, who named his car and his company as Tesla, has contributed to a Nikola Tesla revival.Tesla's vision statement is **"To create the car company of the 21st century by driving the world's transition to electric vehicles".**

Neuralink:

Elon Musk's latest venture is to create a brain machine that will interface with the human brain - called Neuralink - is likely to be something you hear a lot about over these years and it pursues its aim of bringing brains and computers closer together.Musk detailed that Neuralink was a product that would allow humans to effectively merge with artificial intelligence to help fight the rise of AI in general by machines. It is designed to bridge the gap between a brain and a computer, implanting tiny wires -packed with sensors to detect brain activity in a much more detailed way. The wires would pass the information to an external unit that could transmit to a computer, where the data can be used.

-"I think it is definitely a technology to look out for, definitely for its solutions for brain ailments and may be, for the supposed Symbiosis".

The ultimate goal is to radically increase the "bandwidth" between humans and technology. Musk described it as a third layer, saying that it already exists in the form of smartphones - but that output was very slow. Neuralink wants to skip over that to create a symbiosis between brain and technology.

ACE SOCIAL MEDIA – THE MUSK WAY:

He is a channel through which topics can generate interest and hold prominence in the public forums of the internet. Elon uses social media as a means of building value for his brands. As an entrepreneur, it is important to open yourself up to receiving the opinions of your consumers and followers, especially on social media. This

authenticity helps build trust and pays off dividends in the long run, something Elon understands all too well.

A major lesson to take away from all of this is that he is different than many CEOs. He invests in what he believes in no matter how high the financial risks might seem at the moment. His mission is to advance our civilization into other planets as well as reducing our use of fossil fuels. He dreams big and works hard to see his visions come through. Musk is maverick on another level.

-"I'm going to accelerate the world's transition to sustainable energy, using electric cars as a medium to accomplish that goal. Simultaneously, I'm going to ensure the survival of the human race by making our species multi-planetary".

Elon Musk, like many other brilliant minds, started out with a single hit. Throughout history, it's started with just one hit- PayPal, in the early 2000s. Overall Elon Musk is idolized for his out of the box thinking.

COURTESY:
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JEFF BEZOS

Founder and CEO of amazon

Who is Jeff Bezos?

Entrepreneur and e-commerce pioneer Jeff Bezos is the founder and CEO of the e-commerce company amazon.

Born in 1964 in New Mexico,Bezos had an early love of computers and studied computer science and electrical engineering at Princeton university Bezos showed an early interest how things work turning his parents garage into a laboratory and rigging electrical contraptions around his house as a child. He moved to Miami with his family as a teenager, where he developed a loved for computers and graduated valedictorian of his high school. It was during high school that he started his first business, the dream institute, an educational summer camp for fourth, fifth and sixth graders.

JEFF BEZOS CAREER IN FINANCE:

After graduating from Princeton, Bezos found work at several firms on wall street, including fi-let, bankers trust and the investment firm D.E.Shaw. In 1990 Bezos became D.E.Shaw's youngest vice president

While his career in finance he was extremely lucrative, Bezos chose to make a risky move into the nascent world of e-commerce. He quit his job in 1994, moved to settle and targeted the untapped potential of the internet market by opening an "online book store"

FOUNDER AND CEO OF AMAZON.COM

Bezos opened amazon.com named after meandering south American river, on July 18 1995, after ask-

In the months leading up to launch a few employees began developing software with Bezos in his garage. The initial success of the company was meteoric with no dress promotion amazon .com sold books across united states and in 45 foreign countries within 30 days. In 2 months, sales reached $20000 a week growing faster and faster. Amazon.com went public in 1997, leading many market analysts to question whether the company could hold its own when traditional retailers launched their own e-commerce sites.

Bezos continued to diversity amazons' offerings with the sale CD's and videos in1998, and later clothes, electronics, toys and more through major retail partnerships.

By September 2018, Amazon was valued at more than $1 trillion, the second company to ever hit that record just a few weeks after apple.

JEFF BEZOS STARTUPS:

1) Amazon instant video &Amazon studios:

In 2006, Amazon.com launched its video-on-demand service. It was eventually rebranded as amazon instant video.

The company produced and released its first original feature film, spike lee's chi-raq in 2015

2) Kindle E-reader:

Amazon released the kindle a hand held digital book reader that allowed users to buy download, read and store their book selection in 2007.Bezos entered amazon into the tablet maker place with the unveiling of the kindle file in 2011

"we haven't built the best tablet at a certain price. we have built the best tablet at any price". - Bezos said

3) Amazon drones:

In December 2013, Bezos made headlines when he revealed a new, experimental initiative by Amazon, called "Amazon prime air" using drones to provide delivery service to customers.

The first prime air delivery took place in Cambridge, England on December 7,2016

4) Whole foods:

In 2017 amazon announced it had acquired the whole foods grocery chain for$13.7 billion in cash. The company began offering in store deals to amazon prime customers and grocery delivery in as little as two hours depending on the market.

JEFF BEZOS WEALTH AND SALARY:

As of august 2019, both Bloomberg and Forbes estimated Bezos net worth at$110 billion, or more than 1.9 million times the median American household income be 205 topped Forbes list of wealthiest people in the world in both 2018 &2019 Bezos has earned the same $81840 salary at amazon every year since 1998, and he has never taken a stock award. In July 2017 Bezos first briefly surpassed Microsoft founder Bill gates to become the richest person in the world.

In the same way everyone has their idea like jeff and every One should develop their idea to some extent and give employment to the FUTURE YOUTH. Always do experiments and be willing to invent.

SO FOCUS ON PROCESS, NOT FAILURES.

Courtesy:
www.bloomberg.com

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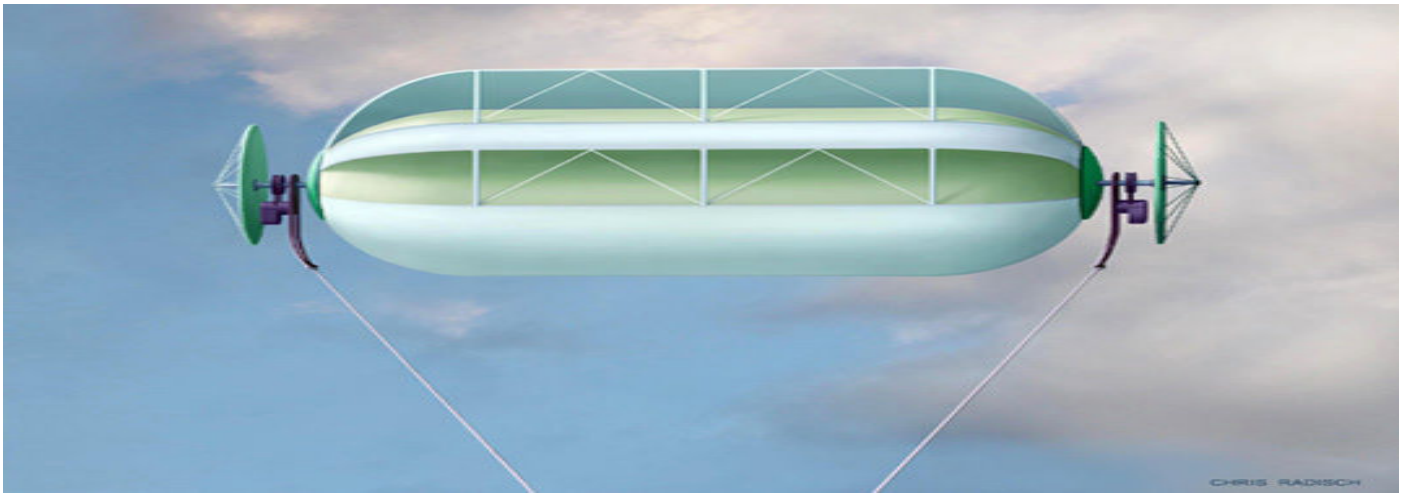
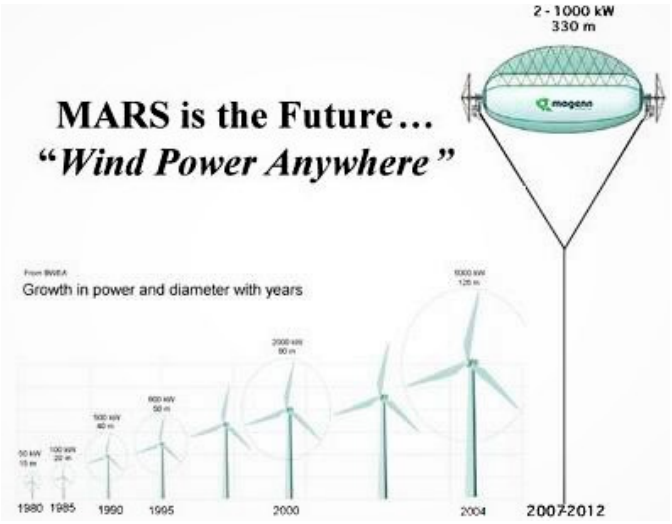
FLYING WINDMILLS



THE FUTURE OF ENERGY?

Electricity is a basic commodity in the 21st century and scientists are constantly searching for new and improved means of generating it.We require power for our everyday use gadgets. Today we will be talking about an innovative power source for us.A flying windmill is similar to a conventional one in its working principle but here the rotor and generator will be floating in air just like a hot air balloon. Thus benefiting from more mechanical and aerodynamic options, the higher velocity and persistence of wind at high altitudes, while avoiding the expense of tower construction or the need for slip rings or Yaw mechanism. The generator will be enclosed in an inflatable structure and the structure is held by a tether and tied to the ground.

FRED FERGUSON, specialized in airships proposed an innovative system as **MAGENN AIR ROTOR SYSTEM (MARS)**.Magenn's design is radically different from other windmills- it would not use propeller blades. Instead, it would be a helium blimp, with Savouries-style scoops causing it to rotate around motors at the attachment- points to its tether. The helium filled MARS is a buoyant turbine made of veteran- a bulletproof material that is stronger than steel if the same thickness and is connected to the ground by an insulated conductive tether.The unit can rise to a height of 300 to 1000 feet to take advantage of more constant and higher wind speeds at higher altitudes that conventional wind turbines are unable to reach.



LIFTINGMECHANISM:

Helium sustains the Magenn Air Rotor System, which ascends to an altitude as selected by the operator for the best winds.The aerodynamic phenomenon provides additional lift, keeps the MARS device stabilized, positions MARS within a very controlled and restrictedlocation,andfinally,causesMARS to pull up overhead to maximize altitude rather than drift downwind on its tether.

MARS is filled with helium gas, which is inert and non-inflammable. The lifting gas created a light force that is in excess of the total weight of the system. The helium provides at least twice the positive lift versus the overall weight of the MARS unit. Additional lift is also created when the rotor is spinning in a wind. The combined lifting effect from buoyant (helium) lift and aerodynamic (Magnus) lift help stabilize the Air Rotor against "leaning" in the wind. In tests, an Air Rotor went straight up and held a near vertical position in various wind speeds, since the Magnus effect increases as the wind speeds. Research indicates that maximum lean will never be more than 45 degrees from the vertical.

WORKING:

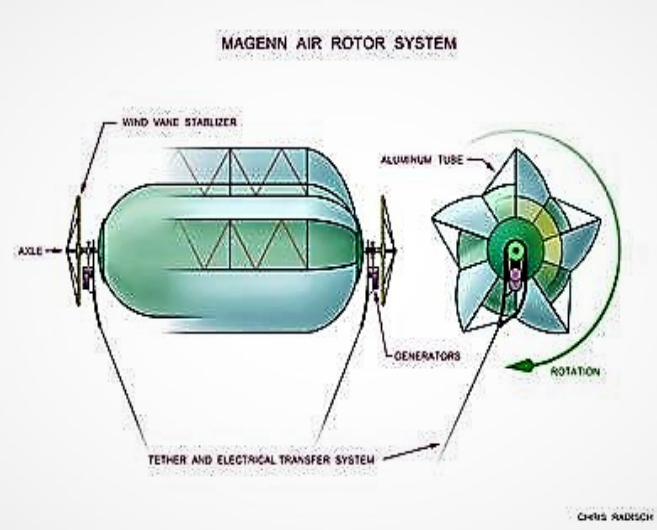
As the rotor of the windmill rotated due to high velocity and it produces very high torque.There's is step-up gear box which connects the low-speed shaft to the high-speed shaft and increases the rotational speeds from 30 to 60 rotations per minute (rpm) to about 1200 to 1500 rpm.The electrical energy thus produced is transferred down the tether for consumption, or to a set of batteries or the power grid.

APPLICATIONS:

1. Off grid for cottages and remote uses such as cell towers and exploration equipment.
2. Developing nations where infrastructure is limited Orton existent.
3. Rapid deployment (to include airdrop) to disaster areas for power to emergency and medical equipment, water pumps, andreliefeffortsandmilitaryapplications.

ADVANTAGES:

1. Flying windmills are even more advantageous as it has ad-hoc generator devices with a reasonably simple tether- system do not have to be permanently installed to one place. They could be trucked out to any location that needed them.
2. Many potential wind farms, places where energy can be produced on a large scale, are far away from places which wind energy is best suited.
3.The most important disadvantage of conventional types is that there is not always enough wind. Whereas at higher altitudes wind conditions are much better.
4. It is a renewable Source of Energy which reduces dependency on fossil energy supply. It also contributes to a healthy environment and cost effective energy solution.



CONCLUSION:

In case of flying windmills the MARS system is very simple to install, requiring minimal on site- work. Despite its large size, no cranes or oversized vehicles were required to deploy the system, nor are they expected to be required for larger units.High- altitude wind power using tethered wind turbine devised that has the potential to open up a new wind resource in areas that are not served by the Government.

COURTESY:
www.seminarsonly.com

By:
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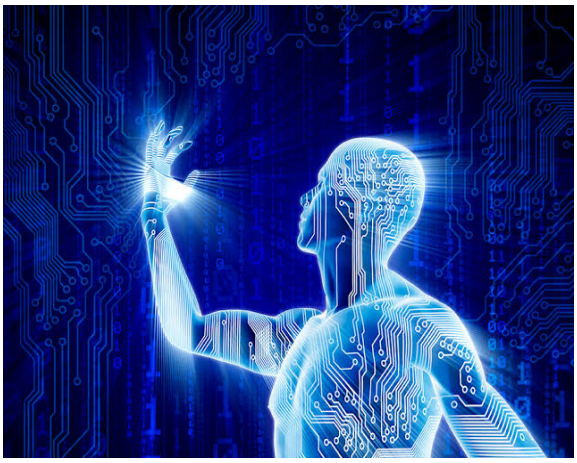
P. srujana,
K. V. S. Kavitha,
B. seshanjali,
1st B.Tech EEE.

EXO-SKELETON



TECHNOLOGY:

Refers to methods , systems &devices which are the result of scientific knowledge being used for practicalpurposes.

NEED:

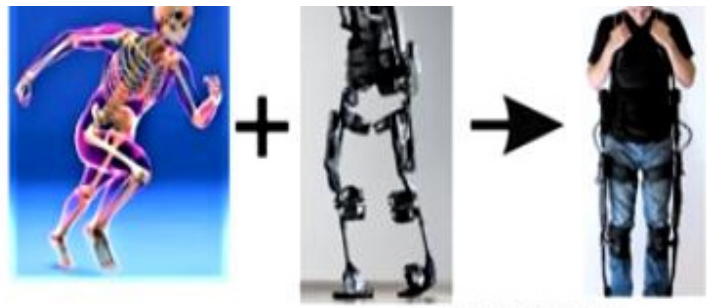
Technology is important because it makes you feel more secure with every year in life for both personal& business reasons with technology advancing more people are able to have across of supplies such as fresh water &food because technology can help deliver those items to people that otherwise we couldn't find it

.

FUTURE TECHNOLOGY:

No one can predict the future of technology exactly, because no one can see the future. However, there are reasonable arguments that can be made, based on the advances and trends of technology in the past.For instance, it is reasonable to predict that computers will get more powerful, numerous, and cheaper. Areas with huge potential which is just beginning to be exploited today, like biotechnology, nanotechnology, and other emerging technologies, will continue to bear fruit.

EXOSKELETON

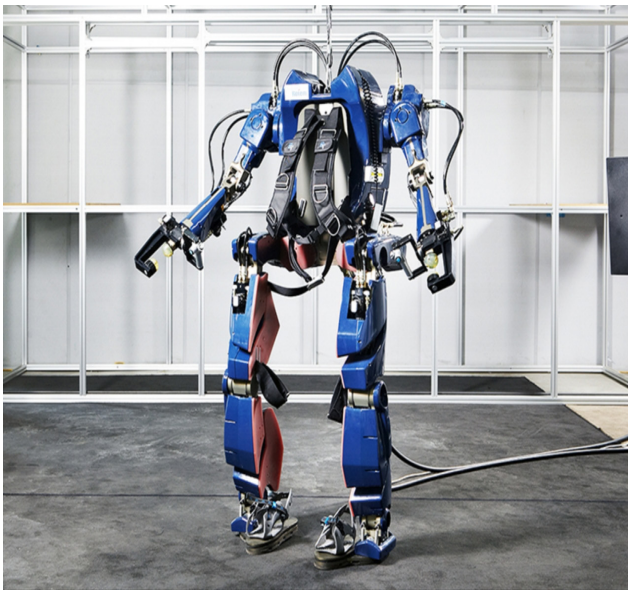


Ekso Bionics Exoskeleton

What is it?

Humans and Animals have a skeleton for protection, support & movement of that bodies.It is skeleton lying outside the body , non living structure.

ROBOTIC EXOSKELETLON



A Mechanical structure frame to be worn by a human.It must provide attachment for actuators and power transmission and also comfortable_uses body interface.It must confirm to the body's and function. It is developed for the military purposes.

The four main functions:

SUPPORT: Supporting physically disabled patients in the field of rehabiliation.
PROTECTION: Protecting the human operator in Hazard's environment such as the battle field &nuclear plant.
ENHANCEMENT: Protecting strength to the human operator as assistive equipment.

HISTORICAL PERSPECTIVES:

i)YAGN'S EXOSKELETON: It is the first EXOSKELETON concept for augmenting running & jagging. Patented in 1890 by NICHOLAS YAGN.
BOW LEAF SPRING -On the lateral side of the legs. HARD

First powered EXOSKELETON.
By Ralph Mosher- 680kgs.
It was unsuccessful ,later made into only arm which is 340kg but not applicable for practical usage.

BLEEX:
pranient exoskeleton under parpa.
4 actuated D.O.F.
Can support up to 75kg-.9m/sec

PHOENIX MEDICAL EXOSKELETON:
Enables stand and walkup weight only 12.25kg
0.5m/sec speed &4hr walking support
As all know ,we want everything in light weight, our current generation is focusing on light weight ,compact EXOSKELETON.

Based on powering exoskeleton is classified into:
1)Powered exoskeleton
2)Passive exoskeleton
3)Pseudo - Passive exoskeleton
4)Hybrid exoskeleton

Applications:
Military
Medical
Industrial
Civilian

MILITARY APPLICATIONS:
For enhancement of strength ,agility
For reducing soldiers and response time

- To protect from strain injuries

MEDICAL APPLICATIONS:

To assist elderly people & restore motor abilities of stroke patients.

MEDICAL USE

MILITARY USE

COURTESY:
www.exoskeletonreport.com

By
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THE NEXT GENERATION OF POWER ELECTRONICS

GALLIUM NITRIDE DOPED WITH BERYLLIUM

SUMMARY :

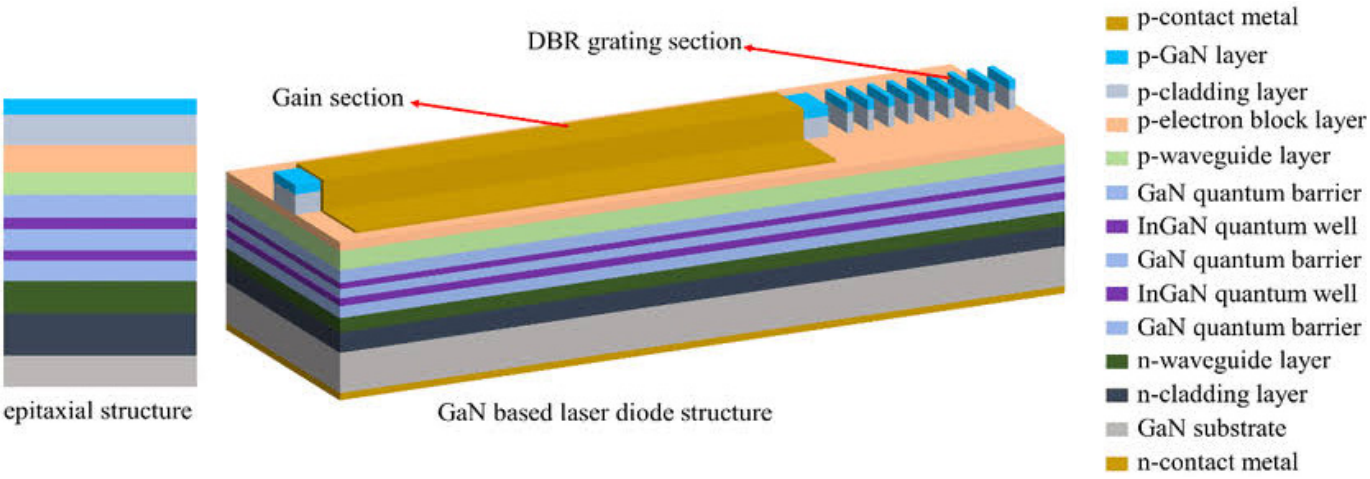
Physicists at Aalto University have discovered a microscopic mechanism that will allow gallium nitride semiconductors to be used in electronic devices that distribute large amount of electric power.

FULL DETAILS :

"There is growing demand for semiconducting gallium

nitride in the power electronics industry. To make electronic devices that can process the amounts of power required in, say, electric cars, we need structures based on large-area semi-insulating semiconductors with properties that allow minimisingpower loss and can dissipate heat efficiently. To achieve this, adding beryllium into gallium nitride or 'doping' it shows great promise"

- Experiments with beryllium doping were conducted in the late 1990s in the hope that beryllium would prove more efficient as a doping agent than the prevailing magnesium used in LED lights. The work proved unsuccessful, however, and research on beryllium was largely discarded.
- Working with scientists in Texas and Warsaw, researchers at Aalto University have now managed to show -- thanks to advances in computer modelling and experimental techniques - that beryllium can actually perform useful functions in gallium nitride.
- Depending on whether the material is heated or cooled, beryllium atoms will switch positions, changing their nature of either donating or accepting electrons.
- If the beryllium-doped gallium nitride structures and their electronic properties can be fully controlled, power electronics could move to a whole new realm of energy efficiency.
- "The magnitude of the change in energy efficiency could as be similar as when we moved to LED lights from traditional incandescent light bulbs. It could be possible to cut down the global power consumption by up to ten per cent by cutting the energy losses in power distribution systems," says Tuomisto.



courtesy - https://www.sciencedaily.com/

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FUTURE TECHNOLOGY

QUANTUM COMPUTER

THE NEXT BIG THING IN TECHNOLOGY

HOW DO THEY WORK:

Quantum computers perform calculations based on the probability of an object's state before it is measured - instead of just 1s or 0s - which means they have the potential to process exponentially more

data compared to classical computers.

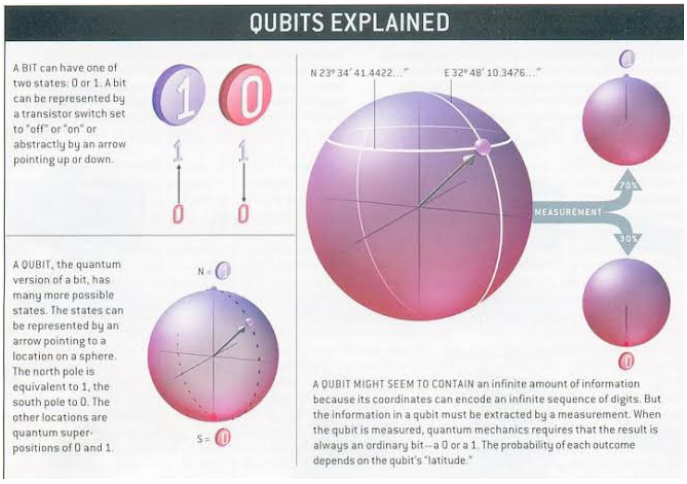
FULL STORY :

Classical computers carry out logical operations using the definite position of a physical state. These are usually binary, meaning its operations are based on one of two positions. A single state - such as on or off, up or down, 1 or 0 - is called a bit.

- In quantum computing, operations instead use the quantum state of an object to produce what's known as a qubit.
- These states are the undefined properties of an object before they've been detected, such as the spin of an electron or the polarisation of a photon.
- Rather than having a clear position, unmeasured quantum states occur in a mixed 'superposition', not unlike a coin spinning through the air before it lands in your hand.
- These superpositions can be entangled with those of other objects, meaning their final outcomes will be mathematically related even if we don't know yet what they are.
- The complex mathematics behind these unsettled states of entangled 'spinning coins' can be plugged into special algorithms to make short work of problems that would take a classical computer a long time to work out... if they could ever calculate them at all.
- Such algorithms would be useful in solving complex mathematical problems, producing hard-to-break security codes, or predicting multiple particle interactions in chemical reactions.

TYPES OF QUANTUM COMPUTERS:

- Building a functional quantum computer requires holding an object in a superposition state long enough to carry out various processes on them.



- Unfortunately, once a superposition meets with materials that are part of a measured system, it loses its in-between state

in what's known as decoherence and becomes a boring old classical bit. Devices need to be able to shield quantum states from decoherence, while still making them easy to read.

- Different processes are tackling this challenge from different angles, whether it's to use more robust quantum processes or to find better ways to check for errors.
- Some companies, such as IBM and Google, claim we might be close, as they continue to cram more qubits together and build more accurate devices.

Courtesy https://www.sciencealert.com/

By
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STUDENT ARTICLES

ISO-LOOP MAGNETIC COUPLERS

Couplers, also known as "isolators" because they electrically isolate as well as transmit data, are widely used in industrial and factory networks, instruments, and telecommunications. Every one knows the problems with optocouplers. They take up a lot of space, are slow, optocouplers age and their temperature range is quite limited. For years, optical couplers were the only option. Over the years, most of the components used to build instrumentation circuits have become ever smaller. Optocoupler technology, however, hasn't kept up. Existing coupler technologies look like dinosaurs on modern circuit boards.

INTRODUCTION:

Magnetic couplers are analogous to optocouplers in a number of ways. Design engineers, especially in instrumentation technology, will welcome a galvanically-isolated data coupler with integrated signal conversion in a single IC. My report will give a detailed study about 'Isoloop Magnetic Couplers'.

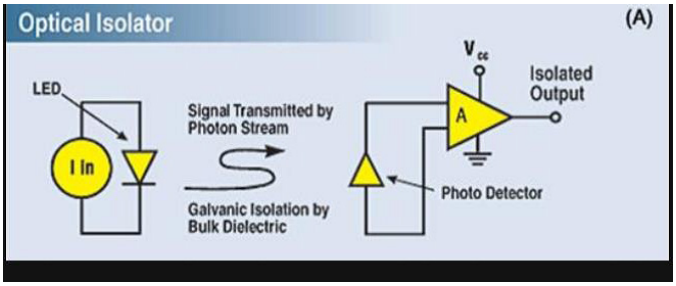
GROUND LOOPS:

When equipment using different power supplies is tied together (with a common ground connection) there is a potential for ground loop currents to exist. This is an induced current in the common ground line as a result of a difference in ground potentials at each piece of equipment. Normally all grounds are not in the same potential. Widespread electrical and communications networks often have nodes with different ground domains. The potential difference between these grounds can be AC or DC, and can contain various noise components. Grounds connected by cable shielding or logic line ground can create a ground loop-unwanted current flow in the cable. Ground- loop currents can degrade data signals, produce excessive EMI, damage components, and if the current is large enough, present a shock hazard.

Galvanic isolation between circuits or nodes in different ground domains eliminates these problems, seamlessly passing signal information while isolating ground potential differences and common-mode transients. Adding isolation components to a circuit or network is considered good design practice and is often mandated by industry standards. Isolation is frequently used in modems, LAN and industrial network interfaces (e.g., network hubs, routers, and switches), telephones, printers, fax machines, and switched-mode power supplies

GALVANIC COUPLERS:

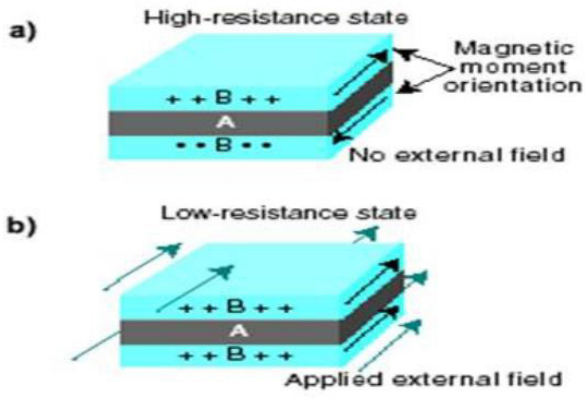
Magnetic couplers are analogous to optocouplers in a number of ways.



Optocouplers transmit signals by means of light through a bulk dielectric that provides galvanic isolation. Magnetic couplers transmit signals via a magnetic field, rather than a photon transmission, across a thin film dielectric that provides the galvanic isolation. As is true of optocouplers, magnetic couplers are unidirectional and operate down to DC. But in contrast to optocouplers, magnetic couplers offer the high-frequency performance of an isolation transformer, covering nearly the entire combined bandwidth of the two conventional isolation technologies.

GIANT MAGNETORESISTIVE (GMR)

Large magnetic field dependent changes in resistance are possible in thin film ferromagnet/ nonmagnetic metallic multilayers. The phenomenon was first observed in France in 1988, when changes in resistance with magnetic field of up to 70% were seen. Compared to the small percent change in resistance observed in anisotropic magnetoresistance, this phenomenon was truly 'giant' magnetoresistance. The spin of electrons in a magnet is aligned to produce a magnetic moment. Magnetic layers with opposing spins (magnetic moments) impede the progress of the electrons (higher scattering) through a sandwiched conductive layer. This arrangement causes the conductor to have a higher resistance to current flow. An external magnetic field can realign all of the layers into a single magnetic moment. When this happens, electron flow will be less effected (lower scattering) by



the uniform spins of the adjacent ferromagnetic layers. This causes the conduction layer to have a lower resistance to current flow. Note that these phenomenon takes places only when the conduction layer is thin enough (less than 5 nm) for the ferromagnetic layer's electron spins to affect the conductive layer's electron's path. In both a and b, the A layers are the nonmagnetic conductive layer and the B layers

are adjacent magnetic layers of opposing orientation. a—Layer A is high resistance because of higher scattering of electrons flowing through it. b—An applied magnetic field realigns the magnetic moments in the B layers, resulting in a lower resistance in lay. The resistance of two thin ferromagnetic layers separated by a thin nonmagnetic conducting layer can be altered by changing the moments of the ferromagnetic layers from parallel to antiparallel, or parallel but in the opposite direction. Layers with parallel magnetic moments will have less scattering at the interfaces, longer mean free paths, and lower resistance. Layers with antiparallel magnetic moments will have more scattering at the interfaces, shorter mean free paths, and higher resistance. In a giant magneto resistive sensor, the resistance of two thin ferromagnetic layers separated by a thin nonmagnetic conducting layer can be altered by changing the moments of the ferromagnetic layers from parallel to antiparallel. For spin-dependent scattering to be a significant part of the total resistance, the layers must be thinner than the mean free path of electrons in the bulk material. For many ferromagnets the mean free path is tens of nanometers, so the layers themselves must each be typically <10 nm (100 Å). It is therefore not surprising that GMR was only recently observed with the development of thin film deposition systems. The spin of electrons in a magnet are aligned to produce a magnetic moment. Magnetic layers with opposing spins (magnetic moments) impede the progress of the electrons (higher scattering) through a sandwiched conductive layer. This arrangement causes the conductor to have a higher resistance to current flow.

courtesy - https://www.academia.edu

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WHEEL CHAIR NAVIGATION SYSTEM

The main aim of this system is for physically challenged people. They can move inside the home without any Trouble. In this system voice recognition system used for physical challenge people so person move from one place to another place with the ease. In the voice navigation system voice from physical handicapped match with the predefined store voice then the chair will move with accepted direction. According to the received voice, the wheelchair is automatically understood end point and the wheelchair moves according to the path which is predefined in system. It is contains obstacle avoidance technique.

INTRODUCTION:

Physicaldisabilityisincreasingrapidlydue to ageing, accidents and diseases like quadriplegics, paralysis and so on .Report from World Health Organization (WHO) says that, around 15% of the world population are handicapped. For this, the use of wheelchair is increasing. But, some people s till can't operate

the wheelchair because of having injury in hand or some other issue in their hand

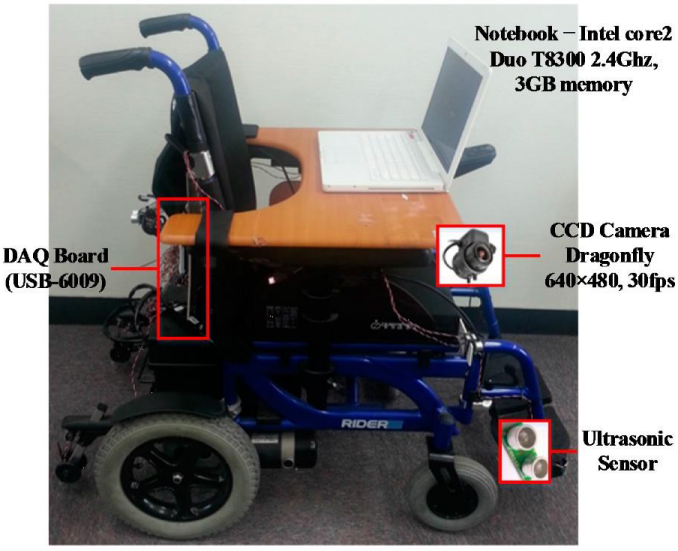
DESIGN:

Design of an Arduino Based Voice-Controlled Automated Wheelchair is proposed by Zannatul Raiyan where a voice module is used to drive the wheelchair through voice command. It offers obstacle detection and also offers GSM based navigation system to track current location of user and send the information to the people concerned. These existing systems include voice operated wheelchair and GSM based navigation system, that is not cost effective and not user friendly. Moreover, these systems provide extremely slow transportation. An electric wheel chair is constructed by adding two240V 200W 300RPM DC motors to a commercial wheelchair . Torque generated by each motor is transmitted to each main wheel through chains. Two parallel 12v lead acid batteries supply power. Ultrasonic distance sensors are attached on every side of a wheel chair . A laptop computer communicates with the motor controller through USB serial. We use two communication channels, one of the controlling two motors (PWM control),and the other for communicating with the ultrasonic sensors. GPS tracking system can be introduced which tracks and sends the information to the smart phone application (user friendly) via firebase, Google's mobile platform development app.

APPLICATIONS:

Hospital

- This chair can be effectively operated by blind people.
- Ability to provide sufficient risk management.
- Obstacles in the way can be detected and avoided by using IR sensor.
- Handicapped person himself can operate this chair.



ADVANTAGES:

Quick and easy maneuver
Reduces man power
User friendly
Less wiring because of Bluetooth
Automated operation
Movement on difficult terrains.

CONCLUSIONS:

Hence ,an automated voice based navigation system which can be used by anyone who requires the help of others for their day to day life for locomotion. The voice of the person using the wheel chair is captured and then the produced voices are taken up and given to voice recognition module for recognition with the predefined voice. Motor module controls the speed and direction of wheel chair with the help of L298N. physically challenged people.

courtesy https://ieeexplore.ieee.org

BY:
-P.Jeevana Praseeda
3rd B.Tech, EEE

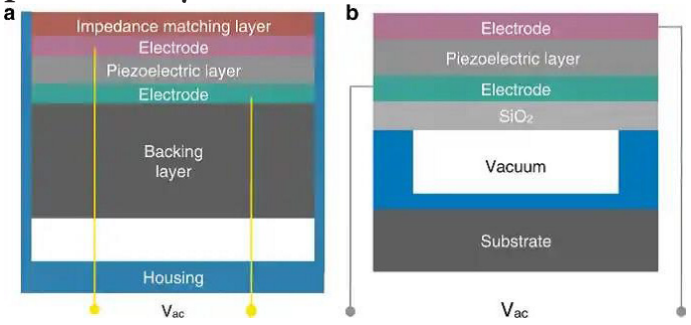
CAPACITIVE MICROMACHINED ULTRASOUND TRANSDUCERS

Intravascular ultrasound (IVUS) is a burgeoning imaging technology that provides vital information for the diagnosis of coronary arterial diseases. A significant constituent that enables the IVUS system to attain high-resolution images is the ultrasound transducer, which acts as both a transmitter that sends acoustic waves and a detector that receives the returning signals. However, there are some drawbacks associated with using the traditional piezoelectric ultrasound transducers such as difficulties in the fabrication of high-density arrays, which would aid in the acceleration of the imaging speed and alleviate motion artifact. The advent of microelectromechanical system (MEMS) technology has brought about the development of micromachined ultrasound transducers that would help to address this issue. Apart from the advantage of being able to be fabricated into arrays with lesser complications, the image quality of IVUS can be further enhanced with the easy integration of micromachined ultrasound transducers with complementary metal-oxide-semiconductor (CMOS). This would aid in the mitigation of parasitic capacitance, thereby improving the signal-to-noise. Currently, there are two commonly investigated micromachined ultrasound transducers, piezoelectric micromachined ultrasound transducers (PMUTs) and capacitive micromachined ultrasound transducers (CMUTs). Thus, CMUTs with different array configurations have been developed for IVUS. In this paper, the different ultrasound transducers, including conventional-piezoelectric transducers, PMUTs and CMUTs, are reviewed, and a summary of the recent progress of CMUTs for IVUS is presented.

INTRODUCTION:

Owing to the crucial role of offering imaging information, different ultrasound transducers on the IVUS system will be presented. Currently, conventional-piezoelectric-based transducers are the most widely chosen because of their mature technology, but they specify an inherently small bandwidth. Besides, rigid piezoceramic materials match a higher acoustic impedance when compared to human tissues. Hence, an acoustic impedance matching layer akin to human tissues is added, but the ideal thickness is usually tough to realize. Furthermore, to fabricate high-frequency arrays, transducer elements should be packed tightly together. As a primary approach to fabricate conventional-piezoelectric transducers, mechanical dicing restricts the pitch dimensions and causes the aliasing phenomena. With the advent of microelectromechanical systems(MEMS) technology micromachined ultrasound transducers can be constructed with a smaller size. Therefore, such transducers can be promising as medical inter-

ventional imaging tools. Piezoelectric micromachined ultrasound transducers (PMUTs) share the fabrication strength of integrated circuits but still exhibit narrow bandwidth. When the center frequency increases, the fabricated membrane of PMUTs becomes relatively thin and fragile. This makes the fabrication process of PMUTs more challenging. The development of MEMS technology also stimulates that of capacitive micromachined ultrasound transducers (CMUTs) in many areas, such as medical and therapeutic imaging and non-destructive testing. Specifically, CMUTs demonstrate numerous advantages in IVUS systems. Compared with conventional-piezoelectric transducers, CMUTs do not need an acoustic impedance matching layer. Instead of mechanical dicing, photolithography technology is adopted to fabricate CMUT. This technology is well suited for fabricating smaller elements and manipulating high-density CMUT arrays. More importantly, the similarity of the fabrication technology of complementary metal-on-semiconductor



(CMOS) and CMUTs allows mutual integration to form CMUT-on-CMOS structure, which reduces parasitic capacitance and improves the signal-to-noise (SNR) The conventional-piezoelectric transducer is an electroacoustic transducer that converts mechanical energy into electrical energy. Two main layers are added to the piezoelectric layer. One is known as the acoustical impedance matching layer that is located on top of the transducer. To achieve better energy transmission between the medium and the piezoelectric layer.

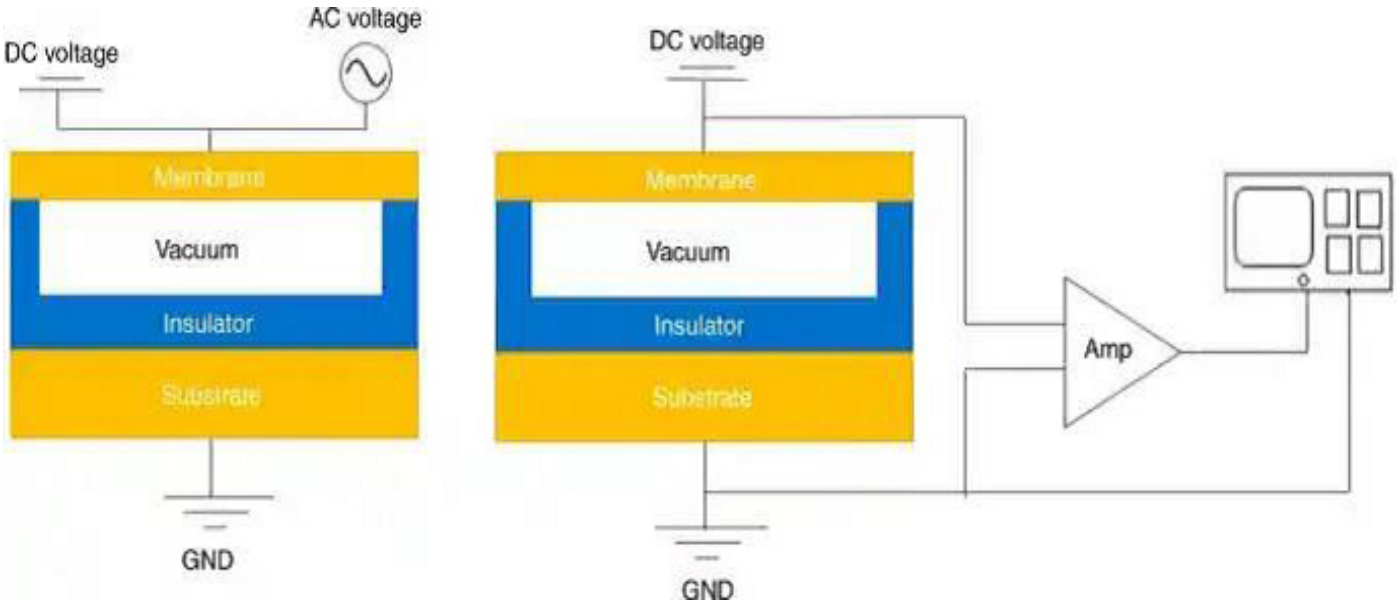
Piezoelectric micromachined ultrasound transducer

PMUTs have solved some of the issues that traditional transducers cannot address—specifically, the integration with application-specific integrated circuits (ASICs). However, the fabrication of PMUTs remains a challenge because the center frequency is sensitive to the residual stress of the active layer. With the increase of frequency, the fabricated membrane tends to be as thin as possible, which may result in membrane cracking during the fabrication process.

Capacitive micromachined ultrasound transduce

CMUTs are MEMS-based devices that can receive and transmit acoustic signals as seen in Fig.2 one CMUT cell comprises a thin membrane suspended on top of a vacuum gap. A thin metal layer is formed over the membrane as the top electrode, and the silicon substrate acts as the bottom electrode. An insulation layer is deposited on the silicon substrate to stop mutual contact between two electrodes. Coating materials like low-temperature silicon dioxide (LTO) and low-temperature co-fired

ceramic (LTCC) are sometimes used to cover the top electrodes to achieve electrical separation. A CMUT has two working modes. In the transmission mode, both a direct current (DC) voltage and an alternating current (AC) voltage are exerted onto the electrodes.The function of DC bias is to make two electrodes closer, and that of AC makes the membrane vibrate to generate an ultrasonic signal.In the receive mode, a DC voltage is employed across the two electrodes. The gap height modulates with the incident acoustic waves. Consequently, the capacitance of the device changes and the output current is produced. After this, the output current is converted into a voltage signal that can be amplified and detected.



CONCLUSION

In this paper,transducers of the IVUS system are discussed. Although conventional-piezoelectric transducers are being widely produced, they mainly rely on lead-based materials that are harmful to the environment and humans. By contrast, PMUTs benefit from the development of MEMS technology, but they are also challenging on account of their challenging fabrication process and low working frequency. In particular, CMUTs exhibited unique advantages over other ultrasound transducers, such as wide bandwidth and capability of manipulating high-density arrays. Such features make them promising for IVUS imaging applications.

courtesy:
https://www.nature.com/

BY:
-B.Greesmitha,
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INVENTORS AND THEIR INVENTIONS

SUBMARINE
Invented in : 1624
Inventor : Cornelius Drebbel

CALCULATOR
Invented in : 1642
Inventor : Blaise Pascal

PIANO
Invented in : 1709
Inventor : Bartolomeo Cristofori

THERMOMETER
Invented in : 1714
Inventor : Daniel Gabriel Fahrenheit

ROLLER SKATES
Invented in : 1760
Inventor : Jean-Joseph Merlin

HOT-AIR BALLOON
Invented in : 1783, Inventors : Joseph Michel and Jacques Etienne Montgolfier

RAILWAY LOCOMOTIVE
Invented in : 1803
Inventor : Richard Trevithick

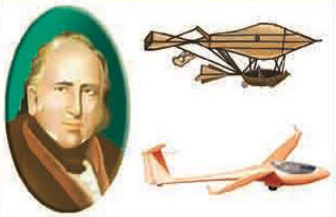
STETHOSCOPE
Invented in : 1816
Inventor : Rene Laennec

BICYCLE
Invented in : 1818
Inventor : Baron Karl Von Drais

COMPUTER
Invented in : 1832
Inventor : Charles Babbage

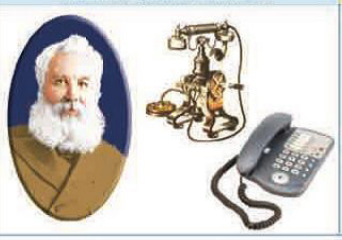
SEWING MACHINE
Invented in : 1846
Inventor : Elias Howe

GLIDER
Invented in : 1853
Inventor : Sir George Cayley



TYPEWRITER
Invented in : 1873
Inventor : Christopher Latham Nsholes

TELEPHONE
Invented in : 1876
Inventor : Alexander Graham Bell



PHONOGRAPH
Invented in : 1877
Inventor : Thomas Alva Edison

LIGHT BULB
Invented in : 1879
Inventor : Thomas Alva Edison

ELECTRIC IRON
Invented in : 1882
Inventor : Henry W. Seely

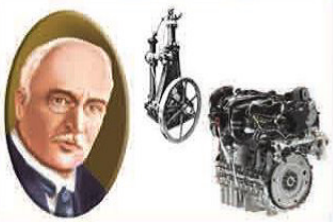
FOUNTAIN PEN
Invented in : 1884
Inventor : Lewis Edson Waterman

CAR
Invented in : 1885
Inventor : Karl Benz

MOTORBIKE
Invented in : 1885
Inventor : Gottlieb Daimler

KODAK CAMERA
Invented in : 1888
Inventor : George Eastman

DIESEL ENGINE
Invented in : 1892
Inventor : Rudolph Diesel



RADIO
Invented in : 1895
Inventor : Guglielmo Marconi

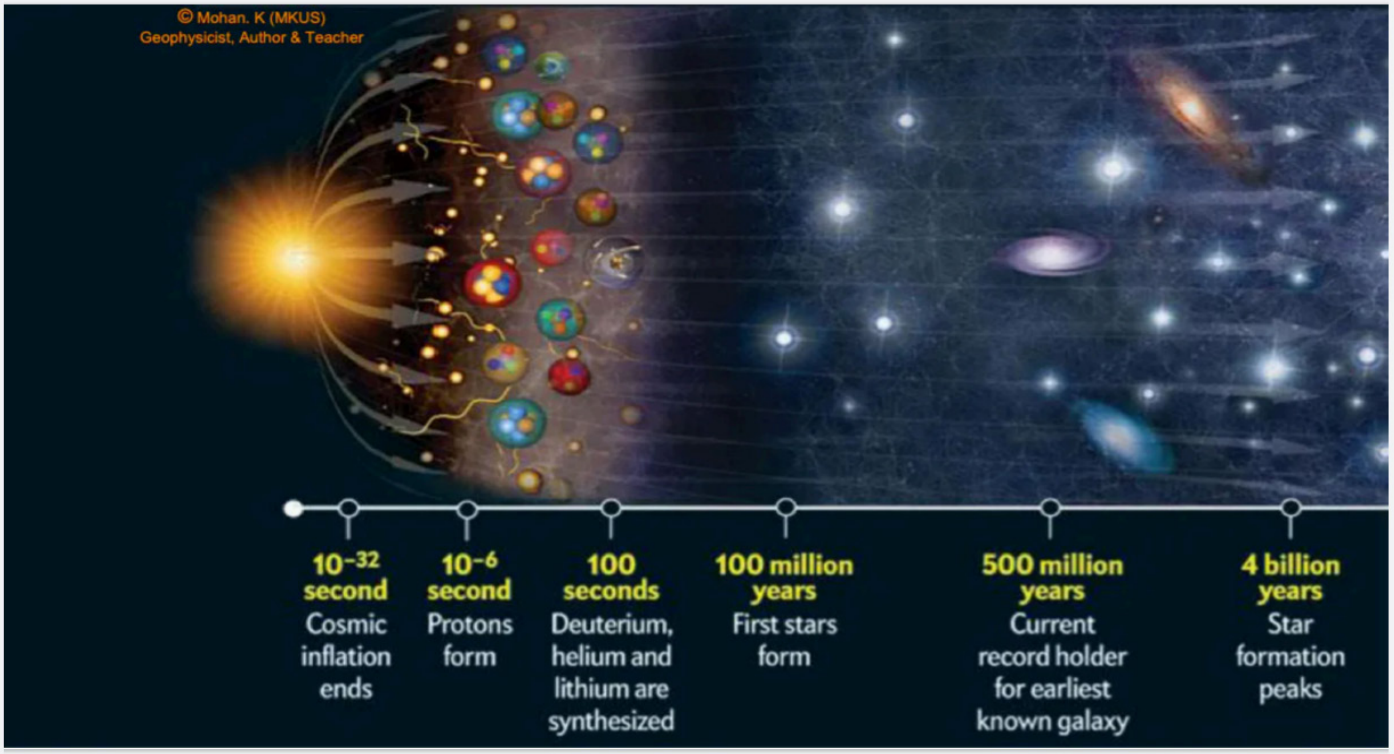
X-RAYS
Invented in : 1895
Inventor : Wilhelm Conrad Roentgen

THE UNIVERSE

FORMATION OF STARS

Stars originate from nebula. Gravitation then pulls together the dust and gas from nebula to form a protostar. These clouds of dust and hydrogen gas then collapse under their own gravity. The center of cloud becomes very hot and nuclear fusion occurs. This process releases so much of energy that the stars then shine with their own light.

• They are the celestial body that generates light by nuclear reactions and held by its own gravity. They are present in the sky even during the day. We do not see them because the sun's brightness hides them. There are billions of them in the universe, more than all the grains of sand in the earth. Stars go

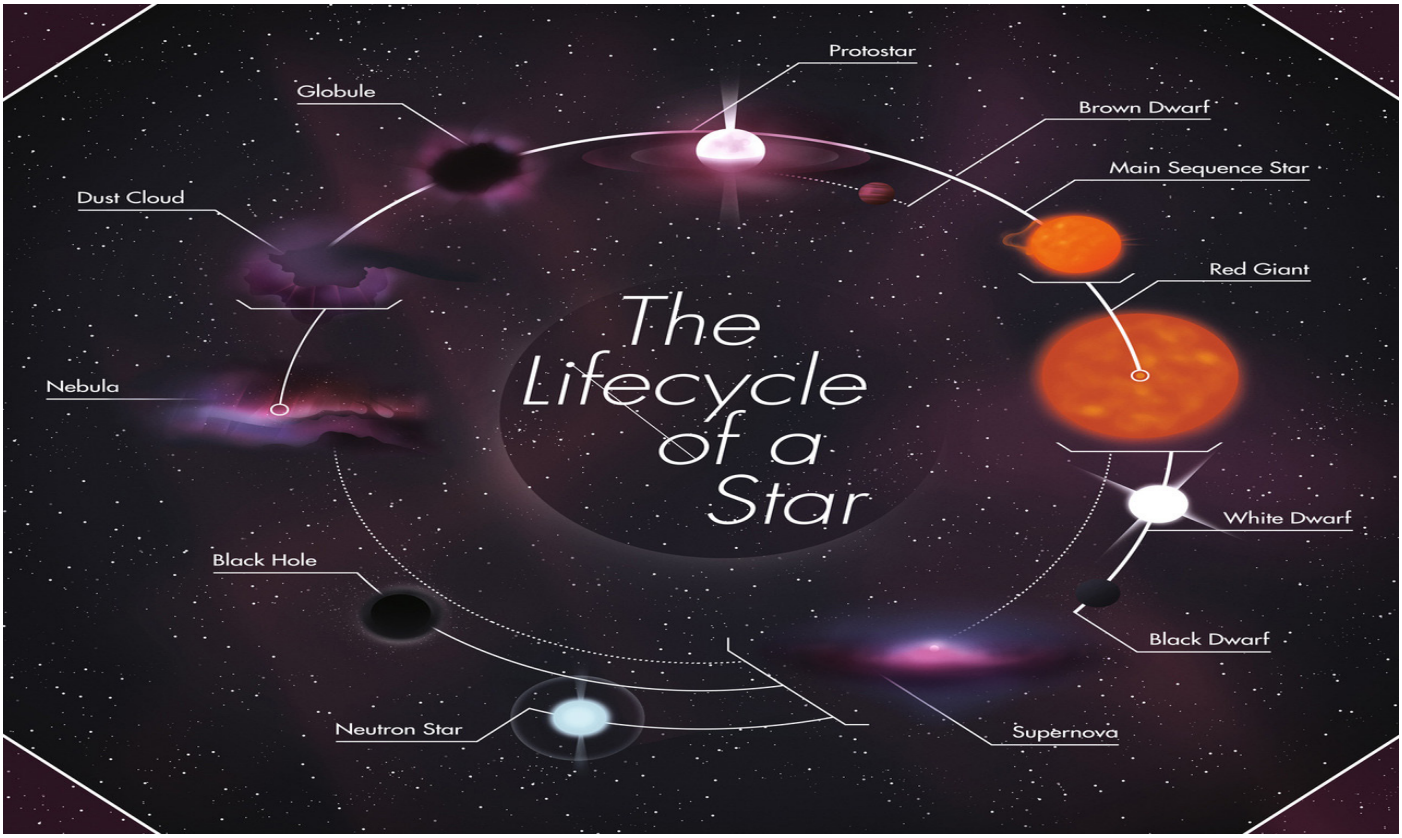


through a natural cycle much like any living beings. This cycle begins with birth, expands through a life span characterized by change and growth and ultimately leads to death. The time frame in the life cycle of stars is entirely different from the life cycle of a living being, lasting in the order of billions of years.

All the stars irrespective of size, follow same 7 stage cycle, they start as a gas cloud and end as a star remnant.

- Giant cloud gas: A star originates from a large cloud of gas. The temperature in the cloud is low enough for the synthesis of molecules.
- Protostar: When the gas particles in the molecular cloud run into each other, heat energy is produced. This result in formation of warm clump of molecules

referred to as a protostar.



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T- Tauri Phase:

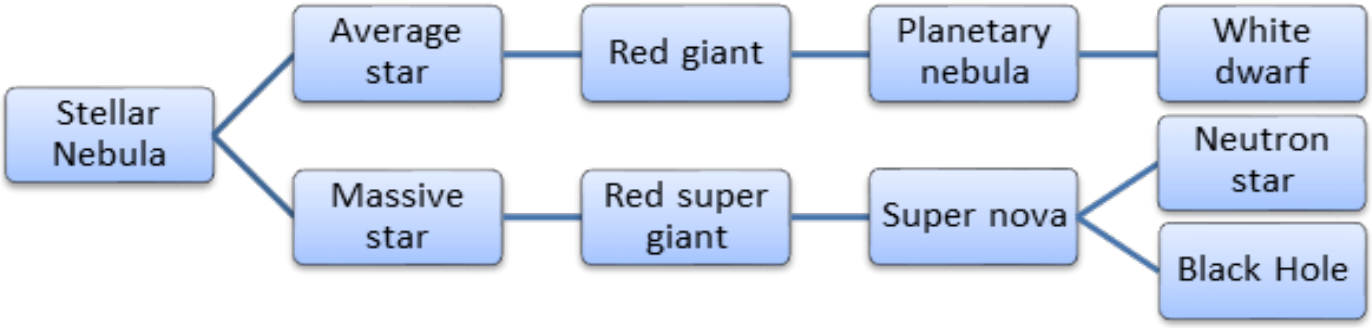
- Begins when materials stop falling into the protostar and release tremendous amount of energy.

Main Sequence:

- Stage in development where the core temperature reaches the point for the fusion to commence.

Red Giant:

- A star converts hydrogen atoms into helium over its course of life at its core. Eventually the hydrogen fuel runs out, and internal reaction stops. Without the reactions occurring at the core, a star contracts inward through gravity causing it to expand. As it expands, first become sub giant star and then a red giant



The Fusion of Heavier elements:
Helium molecules fuse at the core, as the star expands. The energy of the reaction prevents the core from collapsing. The core shrinks and begins fusing carbon, once helium fusion ends. This process repeats until iron appears at the core. The iron fusion reaction absorbs energy, which causes the core to collapse. This implosion transforms massive stars into a supernova while smaller stars like sun contracts into white dwarf.
upernovae and planetary nebulae:
Most of the star material is blasted away into space, but the core implodes into a neutron star or a black hole.

courtesy - https://science.nasa.gov/

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HUBBLE THE EYE OF SPACE

From the dawn of humankind to a mere 400 years ago, all that we knew about our universe came through observations with the naked eye. Then Galileo turned his telescope toward the heavens in 1610. The world was in for an awakening.

The Hubble Space Telescope is named in honor of astronomer Edwin Hubble.
In the centuries that followed, telescopes grew in size and complexity and, of course, power. They were placed far from city lights and as far above the haze of the atmosphere as possible. Edwin Hubble, for whom the Hubble Telescope is named, used the largest telescope of his day in the 1920s at the Mt. Wilson Observatory near Pasadena, Calif., to discover galaxies beyond our own. Hubble, the observatory, is the first major optical telescope to be placed in space, the ultimate mountaintop. Above the distortion of the atmosphere, far far above rain clouds and light pollution, Hubble has an unobstructed view of the universe. Scien-

tists have used Hubble to observe the most distant stars and galaxies as well as the planets in our solar system. Hubble's launch and deployment in April 1990 marked the most significant advance in astronomy since Galileo's telescope. Thanks to five servicing missions and more than 25 years of operation, our view of the universe and our place within it has never been the same.

Hubble Space Telescope Facts :

NASA named the world's first space-based optical telescope after American astronomer Edwin P. Hubble (1889-1953). Dr. Hubble confirmed an "expanding" universe, which provided the foundation for the big-bang theory.

Mission

- Launch: April 24, 1990, from space shuttle Discovery (STS-31)
- Deployment: April 25, 1990
- First Image: May 20, 1990: Star cluster NGC 3532
- Servicing Mission 1 (STS-61): December 1993
- Servicing Mission 2 (STS-82): February 1997
- Servicing Mission 3A (STS-103): December 1999
- Servicing Mission 3B (STS-109): February 2002
- Servicing Mission 4 (STS-125): May 2009

Size

- Length: 43.5 feet (13.2 m)
- Weight: At Launch: about 24,000 pounds (10,886 kg)
- Post SM4: about 27,000 pounds (12,247 kg)
- Maximum Diameter: 14 feet (4.2 m)

Spaceflight Statistics

- Low Earth Orbit: Altitude of 340 miles (295 nautical miles, or 547 km), inclined 28.5 degrees to the equator
- Time to Complete One Orbit: about 95 minutes
- Speed: about 17,000 mph (27,300 kph)

Optical Capabilities

- Sensitivity to Light: Ultraviolet through Infrared (115–2500 nanometers)

Hubble's Mirrors

- Primary Mirror Diameter: 94.5 inches (2.4 m)
- Primary Mirror Weight: 1,825 pounds (828 kg)
- Secondary Mirror Diameter: 12 inches (0.3 m)
- Secondary Mirror Weight: 27.4 pounds (12.3 kg)

Pointing Accuracy

- In order to take images of distant, faint objects, Hubble must be extremely steady and accurate. The telescope is able to lock onto a target without deviating more than 7/1000th of an arcsecond, or about the width of a human hair seen at a distance of 1 mile.

Data Statistics

- Hubble transmits about 150 gigabits of raw science data every week.

Power Needs

- Energy Source: The Sun
- Mechanism: Two 25-foot solar panels
- Power Generation (in Sunlight): about 5,500 watts

• Power Usage (Average): about 2,100 watts

Power Storage

• Batteries: 6 nickel-hydrogen (NiH)
• Storage Capacity: Equal to about 22 average car batteries

Did you know...

• Hubble has made more than 1.3 million observations since its mission began in 1990.
• Astronomers using Hubble data have published more than 15,000 scientific papers, making it one of the most productive scientific instruments ever built. Those papers have been cited in other papers 738,000 times.
• Hubble does not travel to stars, planets or galaxies. It takes pictures of them as it whirls around Earth at about 17,000 mph.
• Hubble has circled Earth and gone more than 4 billion miles along a circular low earth orbit currently about 340 miles in altitude.
• Hubble has no thrusters. To change angles, it uses Newton's third law by spinning its wheels in the opposite direction. It turns at about the speed of a minute hand on a clock, taking 15 minutes to turn 90 degrees.
• Hubble has the pointing accuracy of .007 arcseconds, which is like being able to shine a laser beam on President Roosevelt's head on a dime about 200 miles away.
• Outside the haze of our atmosphere, it can see astronomical objects with an angular size of 0.05 arcseconds, which is like seeing a pair of fireflies in Tokyo that are less than 10 feet apart from Washington, DC.
• Due to the combination of optics and sensitive detectors and with no atmosphere to interfere with the light reaching it, Hubble can spot a night light on the surface of the Moon from Earth.
• Hubble has peered back into the very distant past, to locations more than 13.4 billion light-years from Earth.
• Hubble generates about 10 terabytes of new data per year. The total archive is currently over 150 TB in size.
• Hubble weighed about 24,000 pounds at launch but if returned to Earth today would weigh about 27,000 pounds — on the order of two full-grown African elephants.
• Hubble's primary mirror is 2.4 meters (7 feet, 10.5 inches) across. It was so finely polished that if you scaled it to be the diameter of the Earth, you would not find a bump more than 6 inches tall.
• Hubble is 13.3 meters (43.5 feet) long — the length of a large school bus.

Courtesy - https://www.nasa.gov/

By
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1st BTECH EEE

STUDENT ACHIEVMENTS

PRATHIBHA AWARDS:

E. Kavya Sri	15VV1A0244
MohanaVenkat Nandikanti	16VV5A0262
Durgarao Gurrala	16VV5A0264
HareeshVasamasetty	16VV5A0266
Vadisela David Deenanand Raja	15VV1A0212

PAPER/PROJECT EXPO PRESENTATIONS:

- Manda Padmaja (16VV1A0227), Repaka Mounika (16VV1A0241), Sarojini Florence Yeddu (16VV1A0244), Sodabathina Anusha (16VV1A0248), Thadi Madhuri (16VV1A0250), Kakarapalli Ganeswari (17VV5A0264) of IV B.Tech and G,Mulinaidu (18VV1D5004), K. Naveen Kumar(18VV1D5007)of M.Tech have presented papers in "National Energy conservation Week", APEPDCL on 18.12.2019
- M.Sravani (16VV1A0249) Secured IIIrd place in Project Expo ,Vulcanzy at NIT Tadepalligudem, Andhra Pradesh ,2019

SOCIAL ACTIVITIES FROM EEE DEPT.

IV B.Tech Students Organized blood donation camp in December, 2019.