INNOVATION

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SPACE

Exploration & Technology

IEEE VESIT

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FROM THE EDITOR'S DESK

Dear Reader,

With the likes of *Elon Musk* jumping into the Space game, and with the advancing technology we may never know what could be the next best thing in the field of Space Exploration. Like Space tourism? Who knows ten years down the line we might be standing in a line to board a space shuttle that'll take us to a two-day, one night *vacation on the Moon!*

We here at **IEEE-VESIT** are elated to present to you our annual magazine, INNOVATION, with a series of super intriguing articles written by the student fraternity centered around a very engrossing theme, **"Space Technology and Exploration."**

It is said that the universe that we know today makes up only 4% of the universe! That leaves us with **96% of undiscovered,** unknown abyss. This also means that we have to tap to the fullest potential.

I express my heartfelt appreciation and gratitude towards the Editorial Team for their constant support and valuable contributions in putting this magazine together and making it a huge success. I would also like to specially mention, our former and most talented editor, Suraj Bathija, for being the most encouraging senior, for introducing me to this beautiful field of design and for providing me with all the possible resources. A very special thanks to Madhumita Menon, our WiE representative, and our MPO, Rudrakshi Deshpande for helping me throughout the way and for putting in their best efforts to make this magazine as intriguing and innovative as possible.

We hope our fascinating and well-illustrated magazine took you on a voyage of outer space and will intrigue you into further reading, learning and exploring **immeasurable space and futuristic technology.**

Best Wishes and Happy Reading!

Malavika Anoop

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FROM THE STAFF INCHARGE'S DESK

Dear Reader,

As the world examines the achievements and challenges brought forth by the corona virus, the necessity to go digital has been brought into sharp focus. This digital transformation has brought about a complete paradigm shift and accelerated majority of interactions into a *contactless virtual digital mode.*

Digitization has stepped into bridge the gaps left by mandate shutdowns and social distancing measures.

IEEE - VESIT too was slowly gearing up towards applying digital innovations and tools to the best of their ability.

IEEE -VESIT moved from the offline mode to holding virtual events, streaming services both live, pre-recorded and engage themselves with various flavours of cooperation with its student members, other professional society teams and student community at large.

From moving from **Survival of the fittest to suceeding together,** IEEE VESIT has showcased their **show must go on and teamwork spirit at its best.**

I wish IEEE VESIT the very best for years to come and am sure that the legacy of IEEE VESIT will be carried forward through applying **advancing technologies** for overall skill development.

Dr. Gresha Bhatia
Staff In-charge, IEEE VESIT

CONTENTS

BEYOND THE KNOWN

- Rudrakshi Deshpande (EXTC)
MPO, IEEE-VESIT

What is the first thing that comes to your mind when we talk about space technology? Is it Star Wars? Is it billionaire Elon Musk's much talked about company SpaceX? Or is it ISRO's highly anticipated Chandrayaan-2 mission? It is how little we know about the universe and the infinite possibilities of realities and different life that might exist which expands beyond our imagination. No one really knows about outer space however we put in our relentless efforts in exploring what the universe beyond our earth is like.

First things first, Why do we explore space?

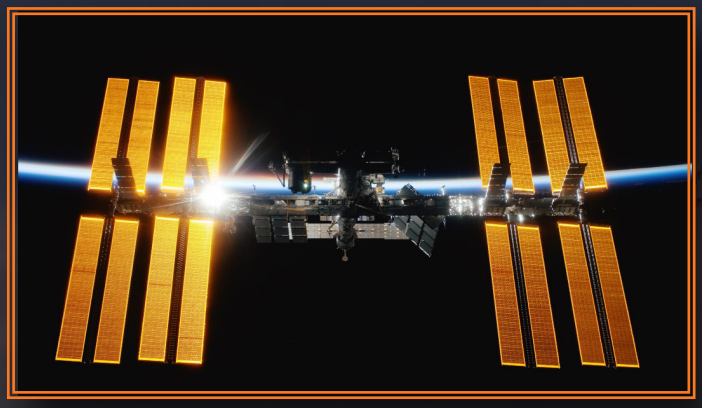
Space exploration began with the uncovering of one fundamental question: The inception of the universe and the evolution of civilisations. Scientists also believe that the possibility of life on the other planet might not be that impossible as it seemed to be. Nevertheless, space exploration is not just restricted to this and contributes a lot more to support sustainable life on our planet. Right from predicting natural disasters to launching satellites for connecting us with our close ones, this could not have been possible without the help of space exploration. Critics may say that investing in space exploration is worthless however without space exploration, we wouldn't have thought of GPS, weather prediction, solar cells and telecommunication advancements.

When did we begin our journey towards space exploration?

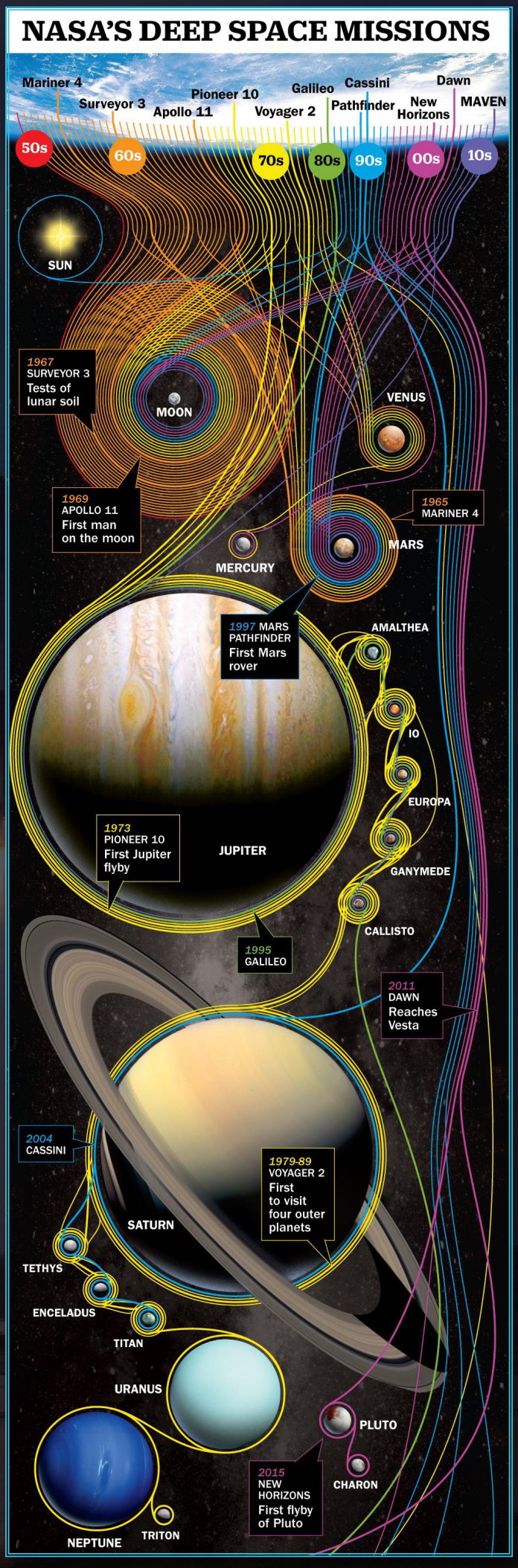
The study of space dates back to 270 B.C when the Greek and Indian astronomers believed that there is a lot more to the universe than just our planet Earth. With the launch of the first artificial satellite, Sputnik 1 on October 4, 197, we began our journey towards venturing into outer space. Following which on April 12, 1961, Russian Lt. Yuri Gagarin marked the beginning of a new era of human beings traversing the expanse of space. The launch of the International Space Station (ISS) in 1998 unfolded the new hopes for research, observation and transportation in the orbital zone. We are now all set to begin a new era of advancements in space technology.

Advancements in Space Technology

The invention of the telescope said to be in 1608 brought the future of the study of constellations and galaxies a lot closer than ever before. The first artificial object LUNA-2 reached the moon opening up several opportunities for man to study our natural satellite. Neil Armstrong marked history by being the first person to have walked over the moon on July 20, 1969. The launch of Telstar 1 made a breakthrough in communication with its capability to provide active two-way communication. The creation of the Global Positioning System in 1973 brought about a revolution in the transport and travel industry.



The International Space Station which was launched in 1998, is a multinational habitable satellite located in the Earth's lower orbit became the first artificial body that can at times be seen by the naked eye. The discovery of water on the moon on November 8, 2008, by ISRO'S Chandrayaan-1, opened up the windows to the potential of the Moon. The landing of a rover on Mars in 2012 opened up doors to the Martian landscape. And now in 2016 SpaceX's 14-year-old Falcon 9 rocket made its first landing aboard a drone ship at sea after dropping off cargo to the ISS. And this is just to name a few.

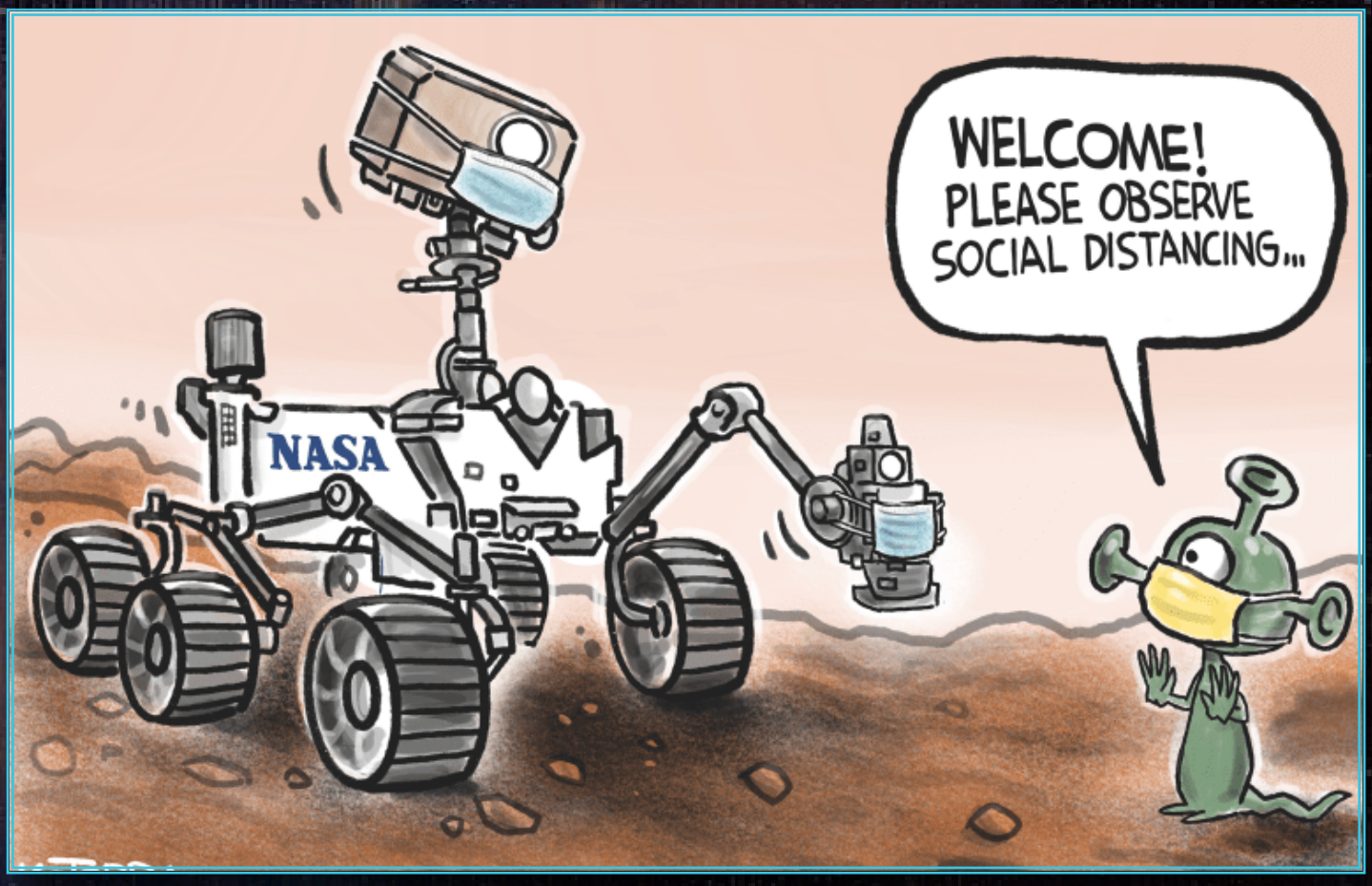


What are the future prospects of space exploration & tech?

The future of space technology and exploration is boundless. With a strong backing of the government as well as private organisations, the focus on utilising the resources of the universe has increased manifold. NASA has set an ambitious goal of returning humans to the Moon by 2024 and establishing a human presence on the Moon by 2028. According to K. Sivan, chairman of ISRO, the Gaganyaan mission may send three Indians to space by 2022.The entry of powerful private players such as SpaceX by Elon Musk, Blue Origin by Jeff Bezos, Virgin Galactic by Branson and a few more makes us believe that possibilities for a common man to travel back and forth from outer space a lot closer.

In conclusion,

The advancements we are seeing today seemed impossible a decade ago and there are several prospects of the universe which are yet to be explored. Today, we are expanding our technologies and industries at a faster rate than ever before. The day we see our imagination come true is not so far away.



IN SEARCH OF HOPE

- Akshata Deshpande (EXTC)
SE Coord, IEEE-VESIT

Almost there. Alex's heart was pounding as she neared her destination, the spacecraft had slid into the NC-17's orbit. After months of being confined in the tiny capsule of her spacecraft in solitude, she couldn't wait to finally land and take a breath of fresh air. Air. Like there would be any air, she laughed at her thought. So far, the planet did not look like earth at all, which made her question whether they misinterpreted the data sent by Hope, before they lost contact and Hope was declared dead. Just a little more patience, Alex said to herself, she was just one step away from discovering all the mysteries that lay on this planet.

Hope was the last of many space rovers sent by NASA to the NC-17 to find traces of life on the planet. While all the previous space rovers died, some during their first orbit and some while landing, Hope managed to land successfully and provided them with evidence that hinted there was a possibility of life on the planet. The death of Hope led to SpaceX deciding to send a crewmember to the NC-17 in search for answers. Months of intense preparation and tests later,

Alex was on her way to uncover the secrets of the supposedly "new earth"

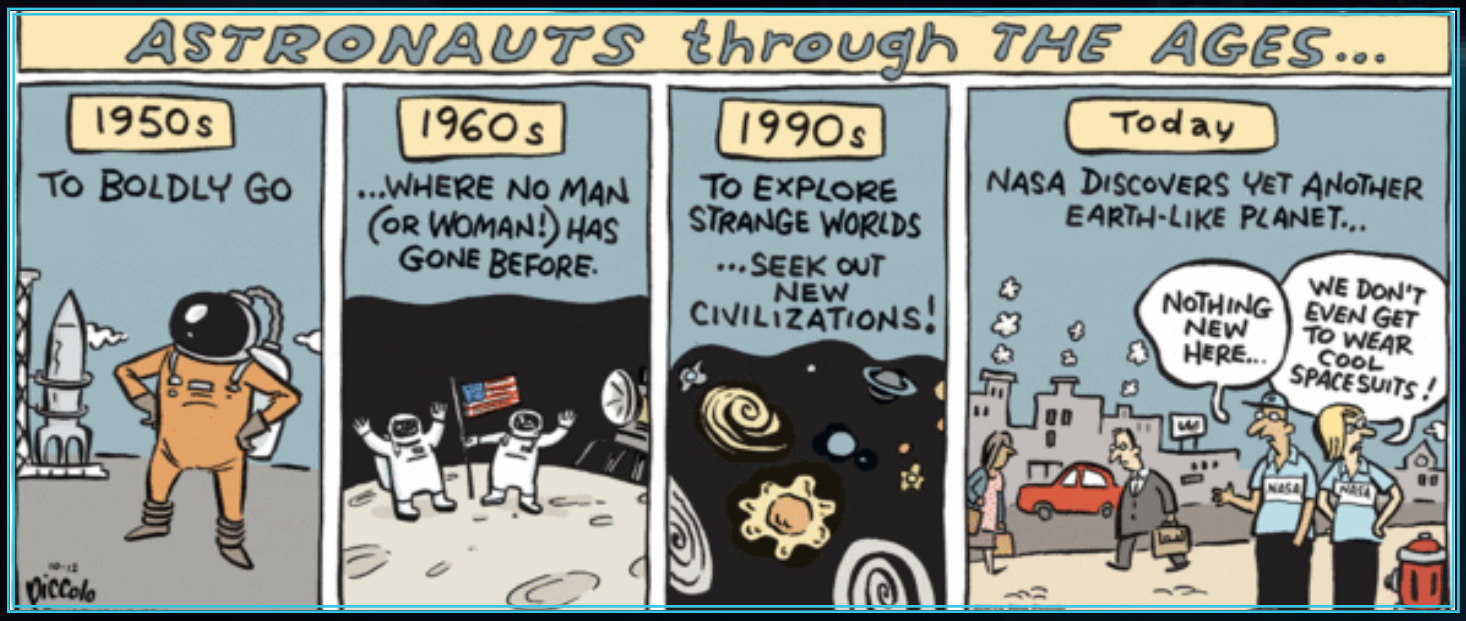
Adrenaline was pumping through her veins as she started her descent on the NC-17's surface. Her spacecraft was equipped with automatic landing radars and her job was to make sure everything went smoothly. But her landing was far from smooth, her landing module experienced heavy turbulence and all the screens went blank, Alex thought her mission was over but her spacecraft managed to land successfully. The next few hours were spent on Alex preparing to make one small step on the surface of NC-17, that would be one giant leap for mankind.

The planet that once looked like an uninhabited barren land from afar now seemed to have a lot in common with her home planet. Alex was bewildered by what she saw. It was almost like the deserted appearance of the NC-17 was an illusion to cover up the existence of this beautiful paradise of land she saw before her eyes. She immediately got busy taking images, running tests and collecting data of the planet to send it back to her team.

Not far from where Alex had landed, alarms were blaring at the Security Center that Nyx worked for, a foreign body had just managed to enter their planet, Vortex. The wall of mirage, which was created by the elders to protect Vortex from getting discovered by aliens, was currently malfunctioning. The heat and friction created by the alien spaceship had somehow caused the wall to glitch. Nyx, being a highly trained guardian, got immediate orders to neutralise the threat to prevent any danger to their planet.

Alex was standing still taking in the beauty of the planet when Nyx approached her. Alex turned around to see a seven feet tall alien levitating towards her. Her body paralysed with fear, she tried to get back into her spacecraft but was unable to move. The last thing Alex remembered before blacking out, was excruciating pain in her head and a scream. Her scream. She woke up alone, her memories were blurred, her rocket was already on its way back to the earth. She had no recollection of how she got back in her spacecraft or what had happened. Everything that happened on NC-17 seemed like a dream, there were many questions on her mind, what was that? Alex tried to piece everything together. She checked the images but photos of barren, uninhabited surfaces greeted her. Filled with disbelief, she turned to check the planetary data system, it showed no traces of water or air or any earth like elements. She gasped. Was it all just a hallucination? Maybe a side effect of all the sleep deprivation? Exhausted from the experience, she sent a single message back to the team:

No traces of life found.
NC-17 is unfit to sustain life.
Mission Failed.



LETS GET QUIZZICAL!

1. Who was the first woman in space?
a) Amelia Earnhart
b) Sally Ride
c) Olga Korbut
d) Valentina V. Tereshkova

2. What was the name of the Apollo 11 lunar lander?
a) Bounty
b) Enterprise
c) Beagle
d) Eagle

3. Who was the first human to orbit earth?
a) Yuri Gagarin
b) John Glenn
c) Icarus
d) Neil Armstrong

4. What was the first man-made satellite?
a) Telstar
b) Sputnik
c) Voyager
d) Apollo 8

5. Which astronaut became the president of an airline?
a) Neil Armstrong
b) Buzz Aldrin
c) John Glenn
d) Frank Borman

Answers: 1 - d, 2 - d, 3 - a, 4 - b, 5- d

UNWRAPPING THE RED PLANET

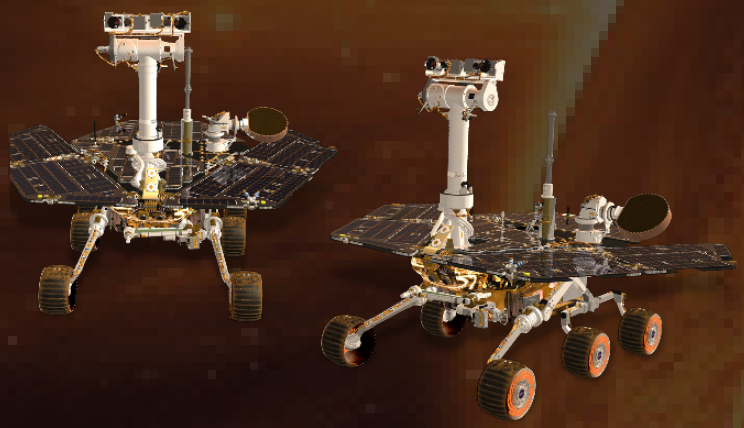
- Juhi Chhatlani (CMPN)
SE Coord, IEEE-VESIT

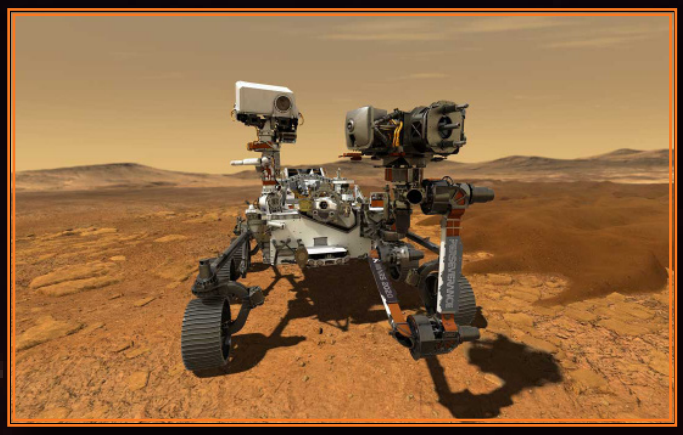
Mars has captivated humans ever since we have set eyes on that star-like object within the night sky. From its blood-like hue to its potential to sustain life, Mars has intrigued human beings for thousands of years. However, the Red Planet is shaped from gas, dirt and polar ice caps. Since the 1960s, humans have sent dozens of spacecraft to review Mars. Early missions were flybys, with the spacecraft furiously snapping photos as they zoomed past. Later, probes forced into orbit around Mars; and recently, a lot of landers have touched down on the surface. Once landers were done, NASA innovatively invented ROVERS to obtain a lot of data regarding life on Mars to feed their curiosity. Rovers have wheels and they specialize in travelling. They land on the surface of Mars and drive around to different spots on the planet. Rovers facilitate scientists in their quest to grasp what different components of Mars are fabricated from. Mars is formed up of several different kinds of rocks, and every rock is created from a combination of chemicals. A rover will drive around to totally different areas, finding out various chemicals in every rock. These chemicals will tell scientists one thing regarding the environments that modified that rock over time.

Over the years, NASA has sent 5 rovers to Mars.

The names of the 5 rovers are Sojourner, Spirit & Opportunity, Curiosity, and Perseverance. NASA launched its Mars scout mission in 1996, the first free-moving rover called Sojourner on the red planet. The rover explored a part of Mars close to its landing site referred to as Ares Vallis. Scientists were inquisitive about this space, as a result, it looked at the positioning of an ancient flood. The rushing water of a flood would have pushed several rocks and dirt into one place. This suggests the rover may study several differing kinds of rocks without travelling very far. Its successors, the rovers Spirit and Opportunity, were launched in 2003. Spirit and Opportunity were created as twins, each carried all of the same scientific instruments. And each instrument was about the dimensions of a golf cart. The rocks that Spirit and Opportunity studied showed scientists that a long time past, water on Mars could have looked a lot like water on Earth. Mars once had lakes and rivers on the surface.

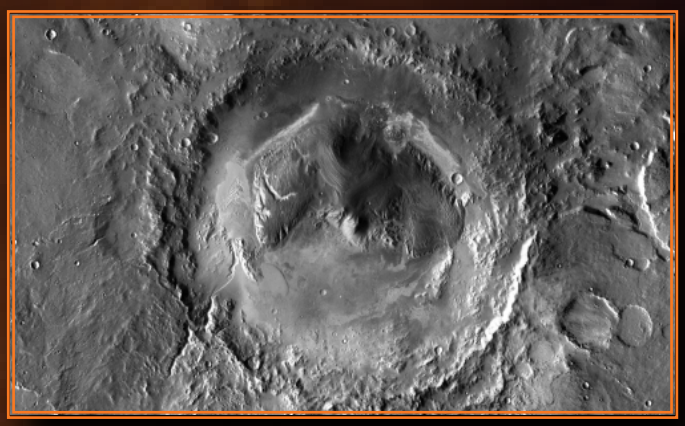
Like Earth, it conjointly had water below the bottom, yet as vapour within the atmosphere.





The Curiosity rover, launched in 2012 and is still wheeling around in Gale Crater, taking otherworldly selfies, and finding out the rocks, and sediments deposited within the crater's ancient lake bed. Curiosity landed in Gale Crater. This crater is special as a result of its tall mountain right in the middle. The mountain has several layers of rock. Every layer is created of various minerals from different time periods. These minerals may tell scientists about the history of water on Mars.

The rover uses several scientific instruments to review the rocks in Gale Crater.



Curiosity used its drill to create a hole during a rock that once was mud at the rock bottom of a lake. One amongst its different instruments studied the powder drilled from the rock. This data helped scientists learn that the Gale crater had ingredients that ancient life would have required to survive.

Now, let us get to know about the fifth rover. Perseverance is a rover that landed on Mars on February Eighteen, 2021. It is still finding out a region of Mars referred to as Jezero Crater. This rover can answer several questions on the Red Planet and rummage around for signs of past microbial life. Perseverance carries 2 microphones — the first ever sent to Mars — to concentrate on Martian sounds, like wind, and the crunch of rover wheels rolling across the surface. It conjointly helps establish different things like radiation, audio, marsquakes, microbiological life and much more. *"I don't think we've had a mission that is going to contribute so much to both science and technology,"* NASA Acting Administrator Steve Jurczyk proudly told Space.com shortly before Perseverance touched down.

"It's going to be truly amazing."

With this being aforementioned, we humans sit here hoping that the rovers and a lot of such missions offer us miraculous results, and we find the existence of life on Mars soon!

MISSION UNFINISHED

- Madhumita Menon (EXTC)
WiE, IEEE-VESIT

28 March, 2054

This mission was a catastrophe. The fact that it was a top-secret mission only makes me feel marginally better. I looked at the extraterrestrial rock that I managed to rescue on my way back to the space shuttle, well, technically the rescue-space-shuttle. The actual spaceship did not survive the landing on planet-52. The only purpose of this rock was to make me feel a little less gloomy, a little less solitary. We could not find what we were looking for, but that's not even half as bad as losing my partner on the mission. I looked around the rescue shuttle and found food bags of mashed potatoes, cheese and ship chips velcroed on food trays, untouched. Tancy's favourite space meal. She always kept food trays taped at the back. I closed the door of the rescue shuttle and prepared my lonely return back to Earth.

05 May, 2052

"We have just got some highly classified information from our rover, Marauder52. I have recommended Tancy and you for this mission and it has to be executed with utmost secrecy.....
..... The mission will take place a year from now. Good Luck!"

28 March, 2054

The take off was smooth, the cruise was silent, except for the parts where some weirdo accidently matched the radio frequency of my rescue shuttle and kept blabbering something. My heart felt heavy and my legs felt numb. I didn't get up once in my entire journey. I just couldn't help thinking of how I would face Tancy's family back on Earth.

17 April, 2052

"...The pictures sent from our Marauder52 showed an animal-like presence and so we ordered some videos captured by the rover. We finished analysing it today.....AND.... I am pleased to say, we might have found a breakthrough. You have a chance to write history here. Prepare well."

- 1 hour

I jolted back to the present as my shuttle hit the atmosphere. The past 30 minutes felt like blur. A lot of Americans say that as the orbiter slices through the atmosphere, the sonic boom can be heard across parts of Florida, depending on the flight path. Just for this reason, I once threw a fit, so my family would shift to Florida and I can hear the boom.

9 July, 2052

" We have arranged for some high-tech equipment and specialised training. There might be an existence of life on planet-52. Now, Tancy and you need to find proper evidence in this regard! This mission is classified until we successfully acquire all the evidence."

- 30 minutes

I jolted back to the present as my shuttle hit the atmosphere. The past 30 minutes felt like blur. A lot of Americans say that as the orbiter slices through the atmosphere, the sonic boom can be heard across parts of Florida, depending on the flight path. Just for this reason, I once threw a fit, so my family would shift to Florida and I can hear the boom.

FUN FACTS!

Did you know?

- Because of limited space, astronauts are restricted to only 3.8 pounds of food a day!
- Ever heard of someone record a song in space? One very famous astronaut, Canadian Chris Hadfield, became the first person to record a song in space.
- Elon Musk's SpaceX has contracted over more than 100 launches.
- ISRO developed an application called Bhuvan which allows users to explore a 2D/3D representation of the surface of the Earth.

bhuvan

- **ISRO is known for its low budget missions. ISRO's budget for 2017 was just $1.4 billion compared to NASA's budget for 2017 which was a staggering Rs $19 billion. Isn't it something every Indian should be proud of?**

- 5 minutes

It's time for me to take up manual control to pilot the vehicle for a touchdown.

- 15 seconds

I have only eaten a few snack bars I found in my spacesuit and stomach is rumbling louder than the vehicle's engine. I didn't touch Tanya's food trays. Maybe giving it to her family will make me feel slightly better.

Touchdown!

Space Center

As I was being helped out of the shuttle I told the technicians about Tancy's food trays and how I want them to be given away to her family. They thought it was a good idea too and Draco went inside to retrieve it. As I was being wheeled into the medical bay, for the post-mission checkup, I could see all eyes on me, some cheering me, some congratulating me while others brimming with sympathy. Except for a few bruises here and there, the doctor said I was in perfect shape to get home. Luckily for me, a highly classified mission that failed miserably didn't require a press conference, meaning I could head home. I have had an empty stomach for ages now.

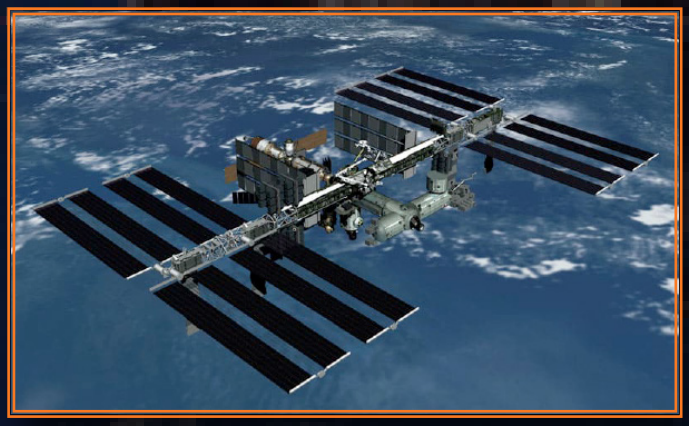
Just as I was about to enter my car, Draco came running up to me. He was all out of breath when he said something that was so chilling yet so intriguing to me. Draco said there were only a few crumbs remaining in the food packets and that maybe I had eaten it after all.

The loud rumbling from my stomach begged to differ and both of us knew this mission was far from over.

AN EDIFICE BEYOND EARTH

- Ishan Kharat (EXTC)
SE Coord, IEEE-VESIT

Space technology has been one of the defining forces of this century. It has become an ideological battlefield upon which each country sought to demonstrate its prowess and win global influence. This colossal swedge yielded both dark and bright moments in the history of Space. One of the inordinate inventions over the past two decades is the International Space Station or the ISS.



The International Space Station is the largest manmade structure in space.

It was built in pieces and launched into space where it was assembled in orbit by astronauts. The ISS took many years to become a reality. In 1984 the United States announced a project called Space Station Freedom. Failing to execute it as its funding was almost cut down by the US Congress, it was later resumed in 1993 when several other countries were bought on board, officially changing its name to The International Space Station. With a solemn aim of conducting research and scientific experiments that could be only performed in space, the major countries that participated in the project are the USA, Canada, Japan, Russia, and countries from the European Space Agency. The ISS is located just outside the Earth's atmosphere, orbiting about 250miles (400km) above our planet. It takes only about 90 mins for the ISS to orbit the earth, which is almost 28000km/h (17500mph), for this, the station is periodically boosted to stay in space.

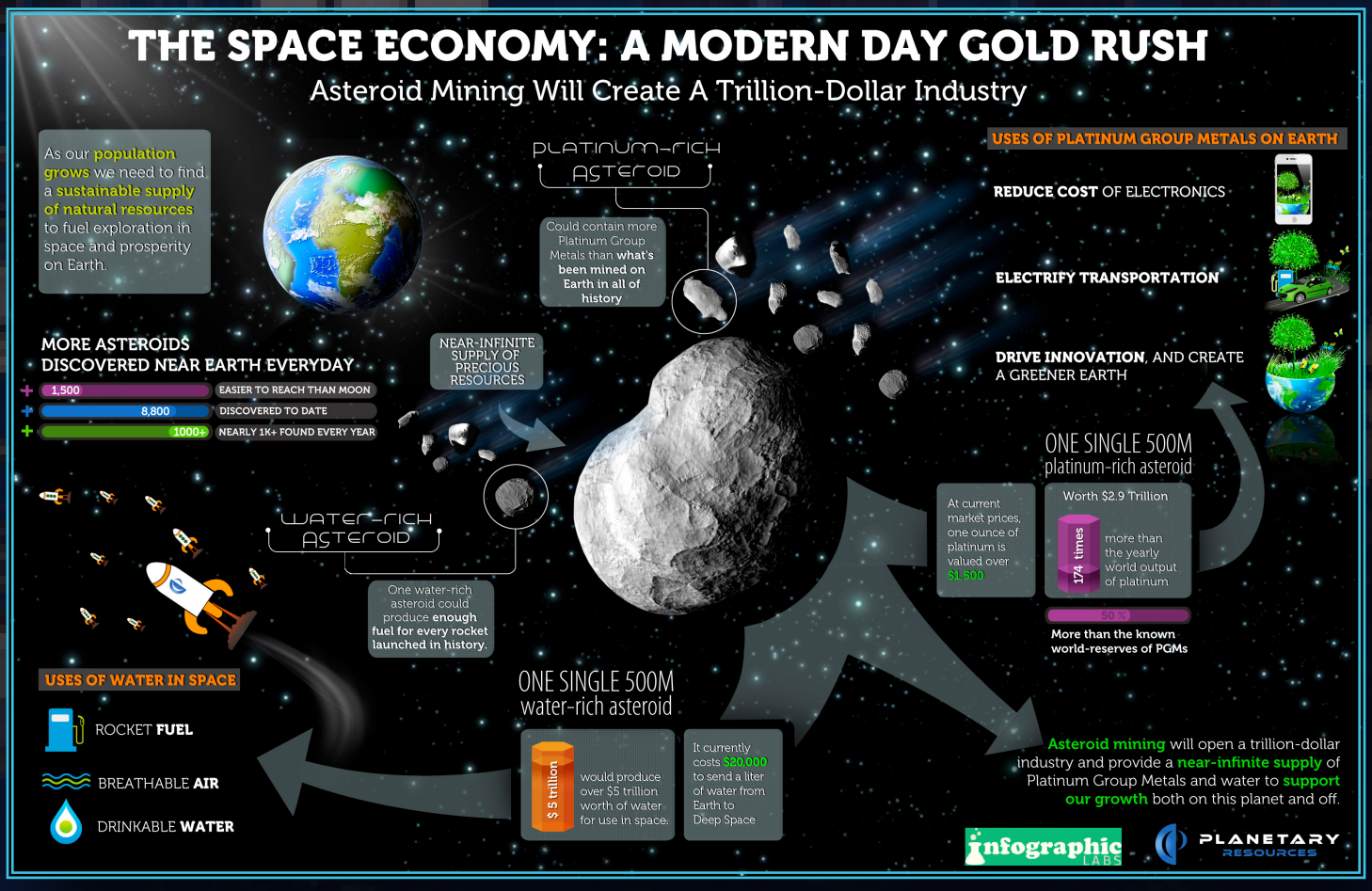
The ISS houses six astronauts on board who generally switch out about every six months so that no one spends too much time in space. These astronauts conduct a variety of research such as on Human Health, 3D-printers, Espresso Machines, Plants, Micro-organisms, and Human body changes in microgravity. The astronauts are not only responsible to conduct science experiments but also for maintaining the space station.

This may sometimes lead to a venture on spacewalks, it might sound pretty captivating, but it's quite hazardous in cases where things are out of control.

The International Space Station, including its large solar arrays, is about the size of an American football field.

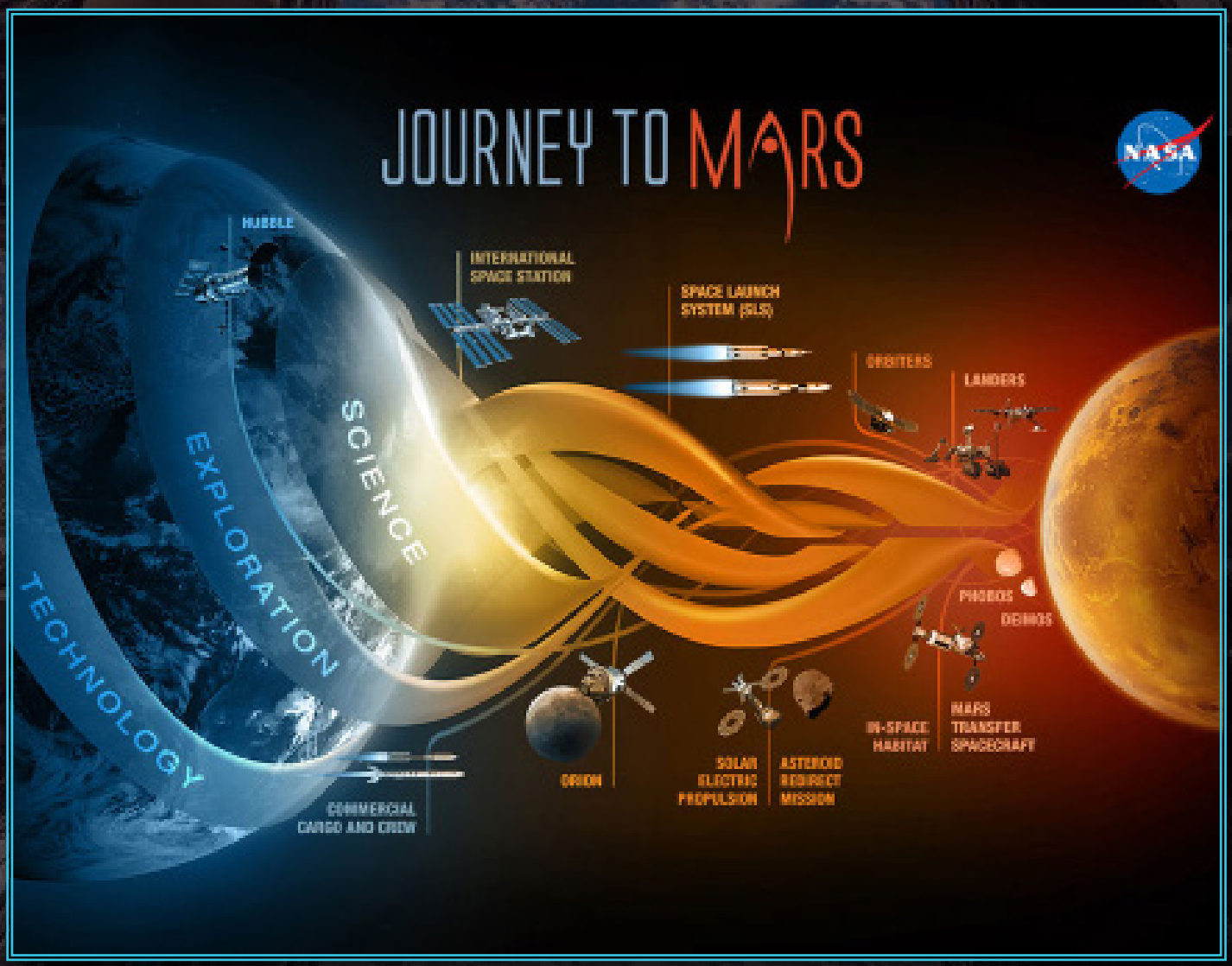
The station comprises various parts, The Integrated Truss Structure is known as the backbone of the station, it holds solar arrays which generate electricity, radiator panels that remove heat from the station. This structure also houses many equipment and science experiments. The space station has various parts known as modules, each of them connected with the help of nodes. The modules are used by the astronauts to live and conduct scientific research. The space station is divided into two segments, The United States Orbital Segment (USOS) and The Russian Orbital Segment (ROS). The first module, the Russian Zarya was launched in 1998. Followed by STS-88 launched by the NASA Unity/Node 1 module. Some of the other major modules and components include the Airlocks, Zvezda Module (Russia), Destiny Module (USA), Canadarm2 (CSA), and The Japanese Experiment Module (Kibo). The Canadian Space Agency made a vital contribution with the Canadarm2, which started a new venture of introducing robotic systems to the space station.

NASA spends between $3-$4 billion every year for the maintenance of the ISS with a whopping $19 billion annual budget, money that can be used in many other projects. The Trump Administration has funded over $23 billion in 2020 and the



funding for ISS has been extended to 2028 from 2024. Before this, the Obama Administration tried to turn over more of NASA's responsibilities over to the private sector. They decided their astronauts to hitch a ride with the commercial companies, giving billion-dollar contracts to Boeing and SpaceX, SpaceX won the race against Boeing by sending two astronauts to the ISS. A $140 million start-up AXIOM is going to build a segment that can be attached to the ISS by 2024 and can be used for commercial business activities. When ISS eventually retires, that component will detach and operate freely as a private space station. As the ISS is not getting any younger, wear and tear on the 20 year old structure means the end of its life sometime in the next decade. According to Russia's prediction, the ISS will burn up and vaporize into fragments, although some parts will fall in an empty ocean of the south pacific. The debris would be equivalent to 32 Tesla's Model X. Even when the ISS will no longer be with us it will be remembered, not only as the most expensive man made structure ever built but as a building block towards deeper missions in space.

Without the International Space Station, a new era of space travel would not be possible.



Mars Exploration **WORD SEARCH**

The Red Planet has been studied throughout human history. The very first mission to Mars was sent in 1960, while the first probe landed in 1971. We've hidden 36 words related to Mars exploration below. They may be placed horizontal, vertical, or even diagonal. Good luck!

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

ALDRIN MARS CYCLER
ARGYRE BASIN
BEAGLE
CURIOSITY
DEIMOS
ELYSIUM MONS
EXOMARS
EXPRESS
FOBOS-GRUNT
GALACTIC GHOUL
GLOBAL SURVEYOR
HOPE
INSIGHT
KOSMOS
MARCO
MARINER
MARS DIRECT
MAVEN
ODYSSEY
OLYMPUS MONS
OPPORTUNITY
PATHFINDER
PERSEVERANCE
PHOBOS
PHOENIX
RECONNAISSANCE
ROSALIND FRANKLIN
SCHIAPARELLI
SOJOURNER
SPIRIT
TEMPE TERRA
THARSIS RISE
VASTITAS BOREALIS
VIKING
WERNHER VON BRAUN
WILLY LEY

THE CUBE

- Shivoham Angal (CMPN)
SE Coord, IEEE-VESIT

"Pass me the ball!"

Oliver screams. Sadly no one passes him the ball. This was not new to him. He sits in the corner of the playground looking at the sky, wondering if he will ever get the ball. Suddenly he sees a small flash in the sky. It fades away in a second. Then a second flash but this one doesn't go away, it leaves a trail of light behind it just like a shooting star but in the day! He wonders if anyone else saw it. He looked around but everyone was busy playing. He must have been the only one who saw it because there were streets around the playground no one just stops and looks at the sky on a busy street.

The "star" seemed to be closer than he thought; in fact it was coming closer. Then in the next few seconds some object drops in the sand pit in the other corner of the playground. No one ever plays at the sand pit. He runs towards the other corner and starts searching in the sand. There it was 'A shiny grey Rubik's cube!' Oliver exclaimed. The bell rings, P.T. class is over. He grabs the cube and puts it in his pocket. He decides to look at it when he goes home.

Upon reaching home he takes the cube out of his bag and starts examining it. He tries to move the sides of the cube but nothing moves. Then he sees some mysterious company logo on the centerpiece of one of the sides. He presses the company logo and all the centerpieces suddenly start going inside. There are what appear to be speakers in place of all the centerpieces. Then he starts hearing a sound. It's a female robotic voice. It says -

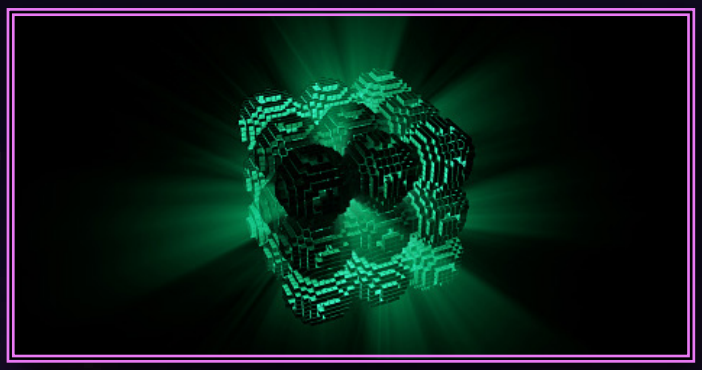
"Please verify your voice note"

Oliver is stunned. This cube certainly looked like some alien thing but it spoke in English. *"Please verify your voice note"* the sound repeats. Oliver says hurriedly- *"Hello I am Oliver."*.

The sound says *"Verifying."* The edges of the cube turn green. Then the sound says-

"Invalid voice note! Access Denied. Who are you? This is Government property."

and the cube turns red. Oliver was baffled. *"How could this thing belong to the Government, to the Earth!"* Oliver exclaims. The AI in the cube replies *"Yes, I belong to the Government. I am the command centre*



of the spaceship that's soon to go into space for exploring the galaxy. Today was just a test run. Unfortunately I fell off the ship."

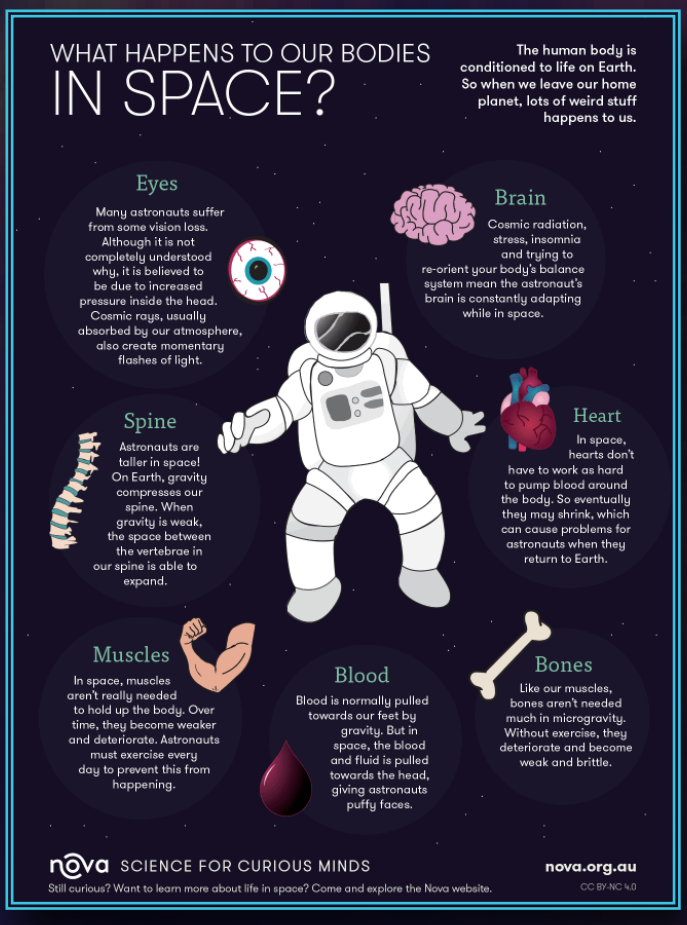
"Why do we not know about this! What kind of government is this!"

Oliver says angrily. Then he proceeds to pick up the cube but, just as he is about to do it the cube turns black. *"Don't even try to pick me up,"* the voice says except it's an intimidating male voice now. Even so, Oliver tries to pick it up but the cube is way more heavier than it was before. He pulls it very hard but he loses his grip and falls on the floor. Then suddenly Oliver hears the front door bust open. The voice says,

"Did you think I would get caught just like that?"

He hears footsteps coming towards the stairs. The cube turns into a bright blue color, as bright as the day. Oliver looks to the door, the footsteps are now on the stairs, they are coming to his room upstairs. Then he looks at the cube, there comes a bright flash of blue light originating from the cube and then he becomes unconscious.

It's evening, the nightjars are singing. Oliver wakes up in his room wondering why he was sleeping instead of going to play with his best friends. Oblivious of everything that had happened, of the blue light that erased his memory, he leaves home and goes to play with his friends.



SOLUTIONS TO FERMI PARADOX

- Simran Huddedar (INFT)
SE Coord, IEEE-VESIT

The Fermi Paradox tries to answer one question that is,

"Where is everyone?"

There are numerous planets in our galaxy and it might be possible that Earth is not the only planet developing intelligent life. Humans came into existence only a few million years ago. If other life developed in our galaxy, it is very unlikely that we are the first, and if not, some are probably millions of years ahead of us. But if they were, why don't we see any traces of them. Sure, colonizing the galaxy takes time, but even at 1% of light speed, a few million years, a cosmological blink of the eye, is enough.

What is the possibility that there are other civilisations in the universe? Will we ever get to communicate with them? **That is what the Fermi Paradox tries to explain.**

Dark Forest Hypothesis

The Dark Forest hypothesis is a scary scenario outlined in the Chinese science fiction author Liu Cixin's book titled Dark Forest. The first axiom is that survival is the primary need of civilization. Therefore, civilizations will do whatever it takes to ensure their survival even if it means hunting down the others. The second axiom is that civilizations always grow and expand. And if an advanced civilization detects the radio signals from Earth then they would know

that we are less advanced and therefore not a threat. Even if a nearby civilization detects us, it would take hundreds or even thousands of years for them to reach us. The universe is a dark forest where every civilization is a silent hunter.

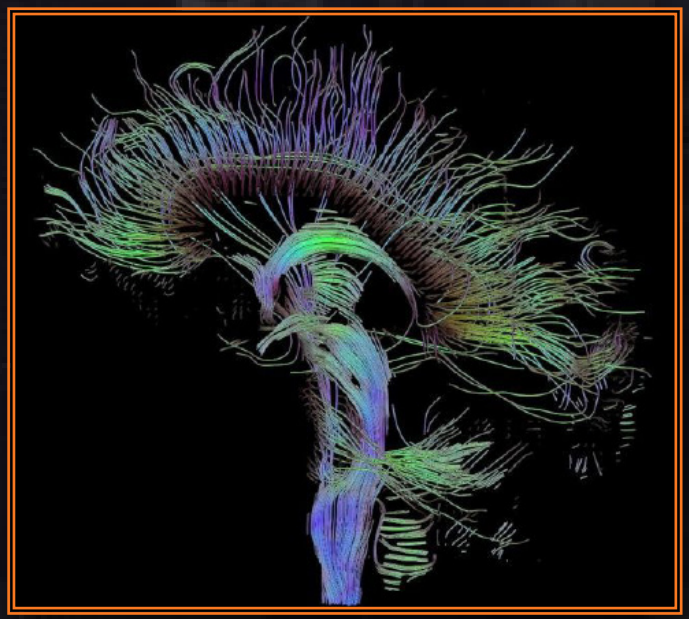
Seti Paradox

While Earth actively scans the skies for signs of artificial radio signals, it very rarely broadcasts any of its own, this happens to be the rarest event that a radio signal is directly sent towards the specific star, that contains information that is interpreted as artificial. As per the

SETI paradox, all advanced civilisations are the same. It would become possible to establish contact if one of the distinguishing features of Intelligence in our Universe is the missionary need to carry to Aliens the Good News that they are not alone in space. Given such enormous distances and, consequently, long signal propagation time, communications should be mostly one way.

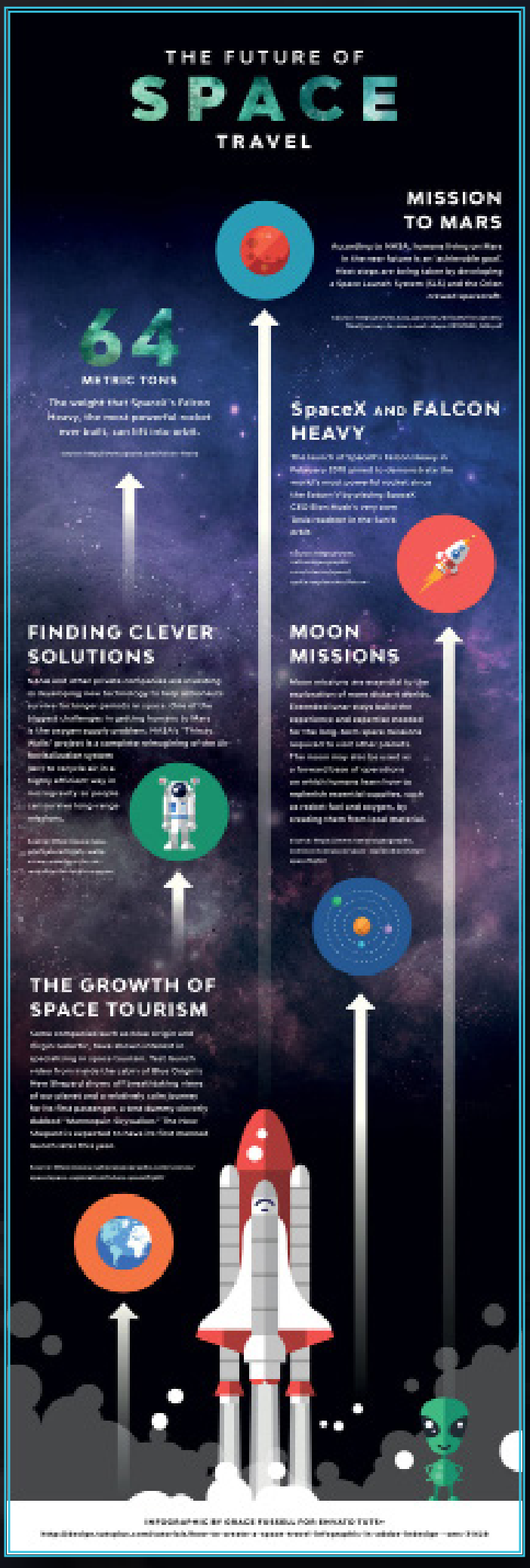
ET in the Cloud

Given the trajectory of human technology, it is very likely that brain-computer interfaces will allow humans to achieve a kind of virtual immortality, by uploading consciousness into computers. ET may well exist in the cloud, and we need to connect to this alien internet to find them. A planet might not be the best place to look for advanced civilisations.



Aliens are too alien

Aliens might just be too alien, made up of dust in the interplanetary nebula, or choosing to live in space stations at a distance from planets that are subject to periodic extinction events. They may have achieved transcendence or singularity,



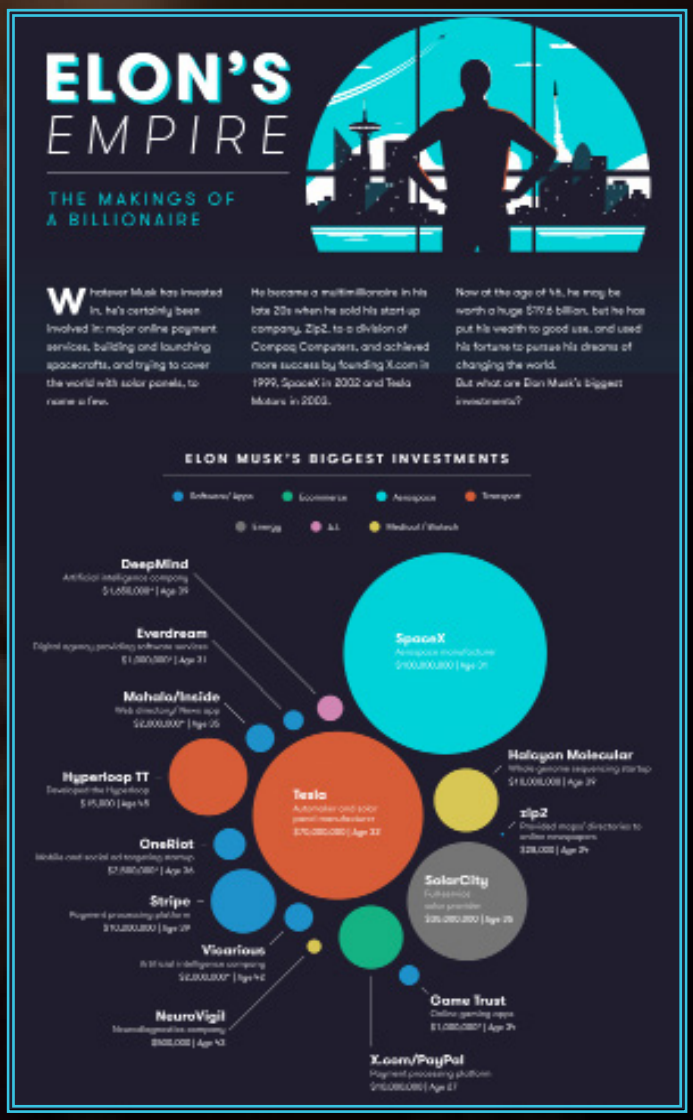
collected into a hive mind, and have very little interest in physical reality. It is hard enough to understand alien cultures on Earth itself, so extraterrestrial life could have very different motivations and goals. They might have used signals that are too slow or too fast for us to process, and their signals may appear as noise to us.

The Great Filter

The Fermi Paradox questions why no alien life has ever come in contact with humans or we would have already encountered it. This means that there is some kind of filter that prevents most civilisations from reaching the stars. So the Great Filter theory suggests that there must be some sort of filter(s) that inhibits life ie., surviving beyond this point is either too difficult or impossible for life forms. Either life has a difficult time emerging from inorganic materials early on, or the odds of catastrophic failure increase as a species becomes more advanced. If the filter is in an early step, then the existence of complex life forms (that includes humans too) is a rarity and we beat the odds just by being here. If the filter is located at a later step, then many ETIs must have reached our current level of development, but failed to progress further. This would mean that the point where extinction becomes likely lies ahead of us.

Life destroys itself

The threat of mutually assured destruction hangs over the Earth, ever since the stockpiling of nuclear weapons began after World War II. This is the major reason that may lead to people launching those missiles. It may be that any advanced civilization eventually ends up destroying itself, and because of this, we have not been able to find any aliens yet. Or possibly according to geological time scales, life may go extinct. here. If the filter is located at a later step, then many ETIs must have reached our current level of development, but failed to progress further. This would mean that the point where extinction becomes likely lies ahead of us.



A SPACE ODYSSEY

- Esha Kadam (EXTC)
SE Coord, IEEE-VESIT

A long time ago, my ten year old self saw a UFO. I was at school then, gazing outside the window, counting the minutes to lunch. I looked above and suddenly saw ripples in the sky. It was as if someone was making the sky shift, maneuvering it with inhumane force. After a few minutes, the rippling stopped, leaving behind crisp silence.

A streak of white light illuminated the atmosphere.

Abruptly a metallic flying craft having a saucer-shaped body appeared in sight, in an aperture amid the clouds.

It hovered there for a few seconds and would be visible to anyone who would have looked up. A UFO! For real? I couldn't believe my eyes. A species, looking very much like a human being descended from the crystalline alien object and paused there for a moment. It waved its hand and then disappeared. No one believed me when I told them about it. But I wasn't willing to accept what I had seen was just an imagination.

This sighting interested me to dive into knowing space. Since then, there had been several advances in the field of astronautics over the years.

Meanwhile, what had happened to ten year old Esha?

Well, I wasn't that young now. I had raced through my school years, growing more and more captivated by space due to my fascination with the existence of creatures on another planet. I suppose that is why I was here today at ISRO undergoing intensive training to become an astronaut.

Looking at my progress so far, an executive summoned me. *"Miss Esha, you may come in."* came a rough voice. He began, *"We've been lately conducting research on an exoplanet and we've got*

some information regarding it. My team has come up with a decision. We plan to send a manned mission to that exoplanet soon." A manned voyage to another solar system was something that had never been done before! I thought to myself. He then continued saying,

"I assume, Miss Esha, that you would like to go on this mission."

His face was devoid of any humor. My jaw dropped. Me, to go on a space voyage! This prospect delighted me. Underneath all my qualms, the young child in me who was alive, answered before I could stop her: *"Yes!"*

After fifteen months of rigorous training and preparations …

The space odyssey had finally begun. After putting on my thick spacesuit, I along with two other astronauts got inside the spacecraft. Within a few minutes, the spacecraft was launched at the scheduled time.

From space, Earth is alive. The greenest greens and bluest blues, landmasses defined more by ancient, tectonic textures and the impossibly thin atmosphere protecting 7 billion people from the dark. There were also millions of shining stars and other planets. All seen while floating weightlessly.

Now we were nearing the exoplanet.

I couldn't believe the journey of seven months was over. It had not been that easy. But we made it, which was all that mattered. We then plunged out of the spacecraft. A deafening sound welcomed my ears, with a drop in pressure so steep I could barely breathe even with my spacesuit on. It wasn't like anything on Earth. We set foot on land, floating. As we moved ahead, I could just see opaque, dull purplish smog around outside. After going ahead several miles, I caught sight of someone waving its hand. The UFO and the waving hand that I had seen years ago. This somehow felt connected. Out of curiosity, I started moving towards it.

Suddenly the universe around me stopped. The purple mist swirled no more and my legs couldn't move now.

"Where are the other two astronauts?"

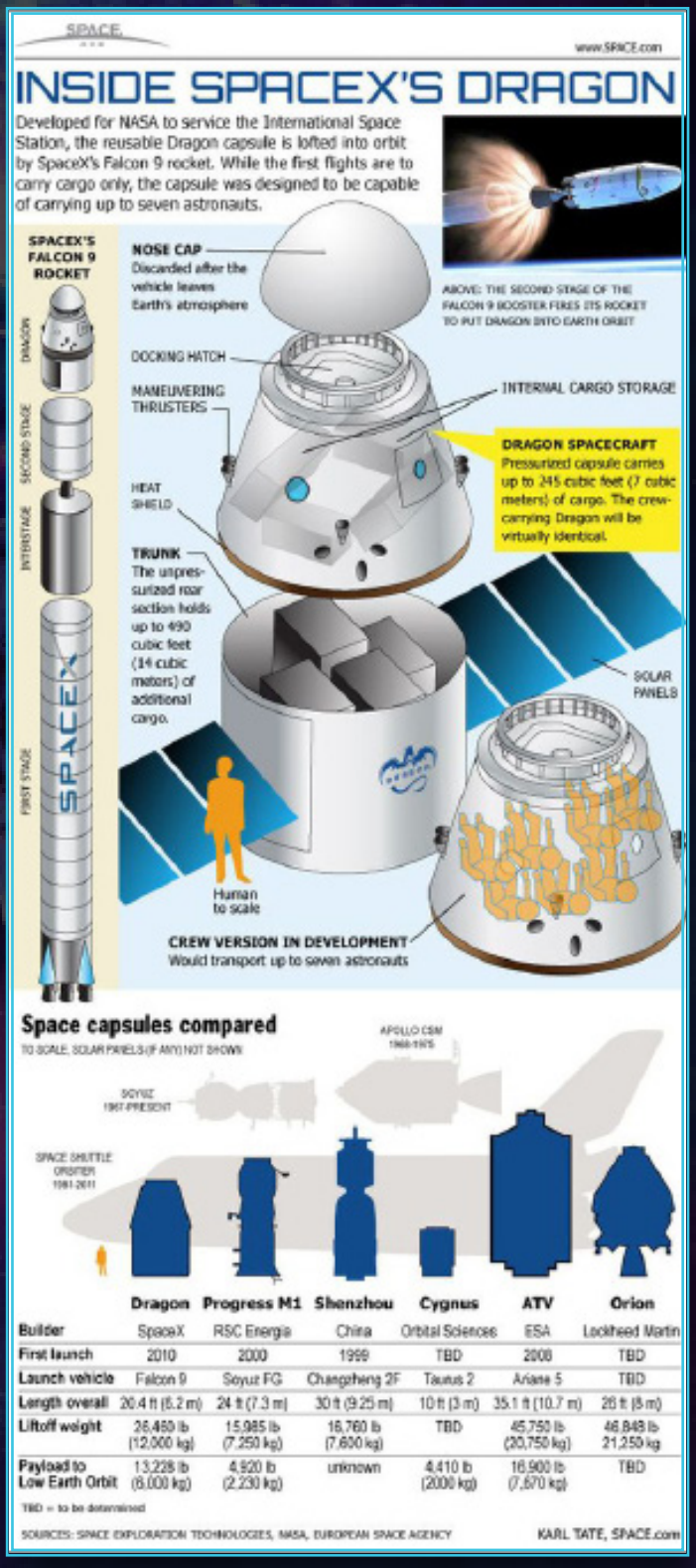
I asked myself, looking around for them. Now I was frightened realizing that I was on an empty land. I looked alongside and

and saw that the alien was standing right beside, towering over me. It gave me a small gift. I opened it and saw that it was a tiny UFO. I was paralyzed. The alien flashed me a smile and suddenly disappeared. I began edging away. The world around me started spinning. Now I had hundreds of questions. I remembered the tugging sensation when I saw the UFO and when I landed on this planet.

The next moment, I was back in the spaceship, strapped to my seat. The other two astronauts were there too. One of the astronauts said,

"Something has gone wrong. We have to leave immediately."

The spaceship began speeding through space, leaving the planet behind. I sat limply on my seat. Reality felt like a dream. I knew what had happened was for real, but still that left a lot of unanswered questions.



THE FUTURE OF SPACE EXPLORATION

- Gautam Govindaraju (EXTC)
SE Coord, IEEE-VESIT

The future of space exploration is quite bright. With the use of the right technology, many organizations across the world have been contributing to this. SpaceX is one such major contributor in this field in recent years since its launch in 2002.

SpaceX, the rocket company created with the mission of taking humans to Mars.

SpaceX has been putting wins on the board ever since the company-founded by serial entrepreneur Elon Musk.

SpaceX has been leading in this field for quite some while now. Also with the release of the Falcon 9, SpaceX has used this rocket over a hundred times now for their launch purposes as it is reusable.

In many countries, a big proportion of expenditure is being spent on space exploration. In my opinion, the space program is very crucial for the whole world and should be funded due to the fact that it will help to improve the communication between countries in the world and also help to search for a new alternative to live. SpaceX since its launch has been trying to do this for over a decade now and have shown us how little we actually know about the outer space and the numerous possibilities for us humans in space exploration.

The SpaceX Crew Dragon capsule was the first manned spaceflight.

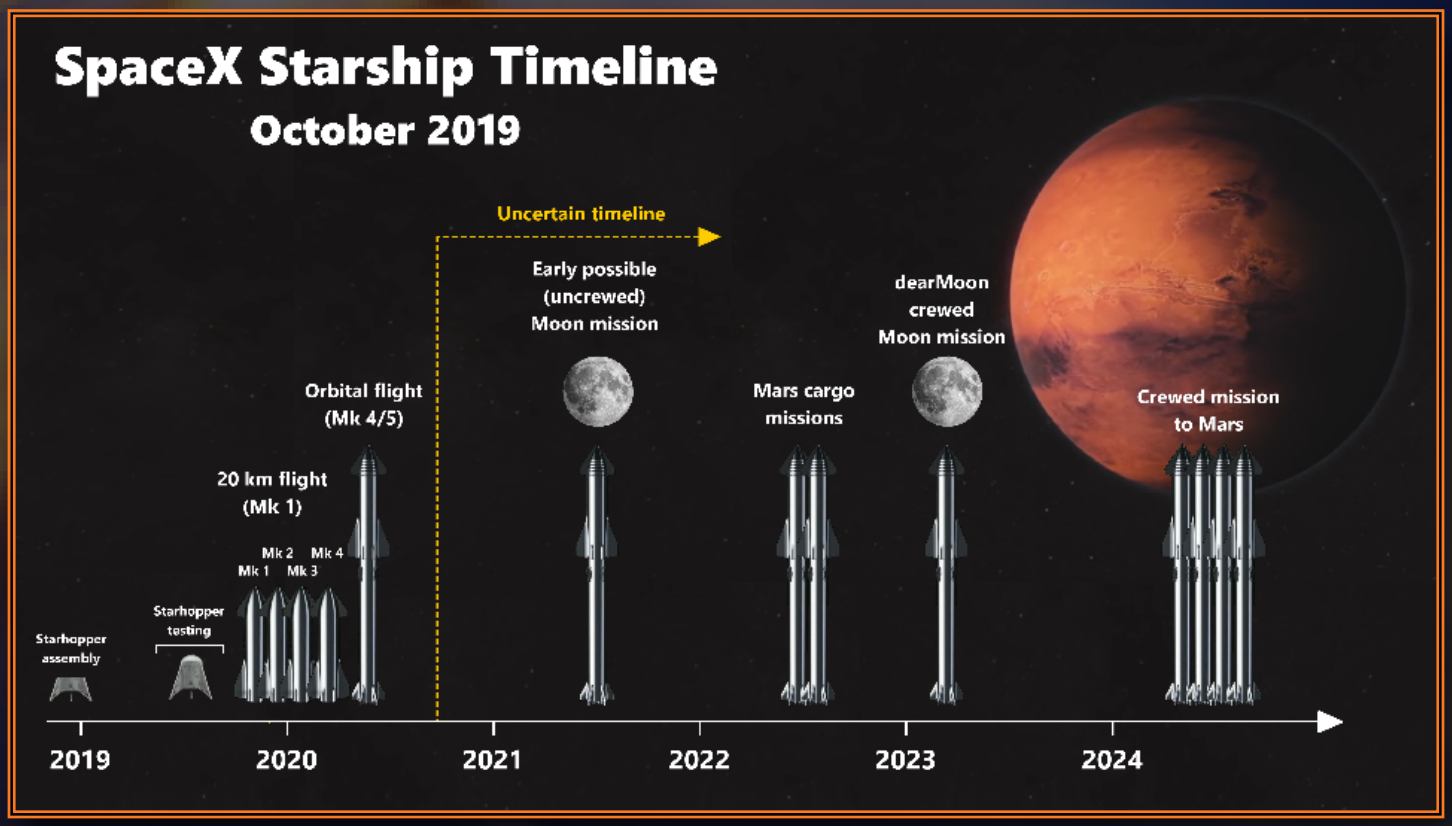
For the very first time, a private spaceflight had carried humans into space.

This milestone became a stepping stone for a lot of private companies. Meanwhile across the world, other rocket enterprises have enhanced and learned from this mission and have started launching constellations of tiny satellites that will help in the development of the way we communicate and observe the Earth.

SpaceX isn't just working on getting things into space. It has also started operating in space to bring the universe to us. With the advancement in technology gradually over the years, space research organizations all over the world have found clues of possible living habitats for the human race in other neighbouring planets. As we all know, due to many reasons like global warming, pollution of different kinds our planet has been constantly degrading. So, it's safe to assume that in a couple of centuries, Human life on earth might not be possible if things go out of hand. SpaceX has been constantly working with NASA to explore different planets. The recent one being the Mars exploration mission. By 2024 SpaceX has planned to send a manned Spaceflight to Mars and land humans on the Red planet which will be a global achievement.

"The reason SpaceX was created was to accelerate the development of rocket technology, all for the goal of establishing a self-sustaining, permanent base on Mars"

Says Elon Musk. It is safe to say that the future of space exploration looks bright with companies like SpaceX playing a vital role in it.



SPACEJACKED

- Bhairavi Joshi (ETRX)
SE Coord, IEEE-VESIT

Zoe was preparing to take the captain's permission to make the hyperjump. She had made all the calculations and mapped the possible routes. She took the papers and made her way towards the control room. The intercom came to life and announced,

"Zoe Springer, report to cockpit immediately"

She ran towards the cockpit. Upon reaching the cockpit, it was in complete chaos. Everyone was fervently inspecting their controls with worried looks.

Zoe made her way towards the captain who was talking to the pilots and other officers. Nova noticed her and said, *"Thank goodness you're here. We have a big problem; hijackers are coming in from port side, half-light year away. We must find a way to escape them. Have you determined a route to make the hyperjump yet?" "Yes captain. I was just about, coming to provide those calculations."*

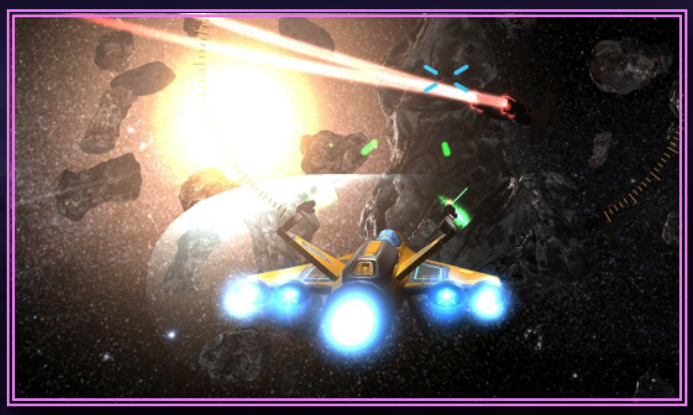
Captain Nova studied the paper carefully. "If we make the jump in 5 minutes, we can escape the pirates. Can we make it in time?" "Yes captain. We will make the preparations" said one of the pilots.

"Prepare for defence, man the blaster guns and put up the protective shield."

The crew ran to do the duties assigned.

The pirate ship was fast approaching. The Captain was commanding his crew to go faster. *"Can't this piece of junk go any faster!? The boss leaves me with a bucket of bolts for a spaceship and a bunch of dimwits as a crew. Anyone who lets that ship escape will be blasted off!"*

"Send the transmission for them to surrender. If they don't, we attack and take the ship"



In a few seconds the reply from the BR100 SK had arrived. They would not surrender; and would die trying to defend themselves. The captain gave orders for attack preparations.

"Captain! They are going to attack us. We are not ready to make the hyperjump. They may track and tailgate us. What are the orders?" asked Elijah, one of the officers. *"We fight and when the time is opportune, we will make the jump. Send a transmission home that we are under attack." "The shields are fully operational, and the blast guns are manned!"* the defence officer informed.

"We wait for them to get in range and attack."

The distance between the ships was decreasing. Both the ships were preparing their guns and shields. The captain of the RK Z-07 gave the order for attack. The BR100 SK retaliated. Nova ordered them to aim for the blaster guns. They destroyed two of the four guns. The pirate ship was nearing, and the federation ship had suffered major damages to their defence shield.

"Activate the jamming code and stop their functions. They should not escape at any cost. That ship is valuable."

The jamming code was launched, and the crew of the federal ship suddenly had no control over the ship. The pilots, Luke and Matt were trying hard to steer the ship, but it wasn't responding.

"Tell every crew member to assemble here now!" Captain Nova exclaimed. The intercom blared with the instruction. All the officers were present in the cockpit in less than a minute. *"Everyone grab a laser gun each. Hide it in your boots. We will fake surrender, strike when the opportunity arrives and get out of here with our ship. I will give the signal when I see an opening. Everyone at my signal, will sabotage the guards so they can't alert others. Is that understood?" "Yes captain!"*

The RK Z-07 came to a stop beside the BR100 SK, successfully capturing it with its force field. The pirate guards came in the ship, aiming their guns at the crew. *"Who's the captain?"* One barked. *"I am"* Nova stepped forward.

"We are surrendering so please don't hurt anyone."

"We'll see about that." The guards took the whole crew to the captain's quarters. *"Here they are, sir." "Now that our boss has your ship, we are going to be rich!"* The captain laughed evilly. *"Take them to the holding cells!"*

While the crew was being dragged towards the prison, they passed the control room. On Nova's signal, everyone disarmed the guards, rendering them useless. They broke into the control room, disabling the jamming code. They disabled the security systems, successfully overriding it, along with the locator systems and left the room. They rushed towards the hanger and boarded the ship quickly. They restored their systems and set course for their home planet.

WOMEN IN ENGINEERING

- Ayesha Gulrajani & Madhumita Menon
Women in Engineering Heads

While the world has globally evolved to accept equality in most spheres including gender, color and age, this evolution is still much nascent in pragmatic stature. It is our proud privilege to state that VESIT has been a forerunner in identification and development of knowledge and skill to all equally, without any bias whatsoever. Stemming from that, IEEE has been one of the only organizations which has decided to boost this development in a unique manner. As a flagstone achievement, IEEE has incepted this corner, 'Women in Engineering', exclusively to

Take further embryonic steps for shifting the focus towards seeking better knowledge without any gender bias.

With this aim in mind, we have conducted events throughout the academic year with the sole aim of providing a common ground to all, equally, for expression of technological talent, whatever their gender may be. In this manner, everyone worked towards the common cause of advocating Women in STEM. With this intangible aim, a lot of brainstorming and planning went into the conduct of the two noteworthy and successfully executed events – The Essay Writing Competition and the UI/UX Workshop and Competition.

UI/UX WINNERS

1st Place : Sristi Kushwaha (D14B)
& Vignesh Poojary (D9A)

2nd Place : Nidhi Nair (D8)

3rd Place : Ryan Rodricks (D10A)

The Essay Writing Competition required the participants to put on their thinking caps to identify and tackle everyday predicaments faced by women, be it in their colleges or their workspaces. Our other event which saw more than a hundred participants, the UI/UX Workshop and Competition, had the workshop participants learn the basic designing and prototyping of a website that served as a learning/teaching space cum discussion forum for women, further this event enabled the participants to get their hands dirty with the competition that saw participants putting their best designs forward to make a podium finish.

All in all, the WiE section envisions to further gender diversify fields of STEM with our humble contribution towards the cause.

VOICE OF AN EMPOWERED WOMAN

- Mallika Kulkarni (EXTC)
First Place

"Why am I not allowed to stay late until dark in the college, and why am I not given the liberty of wearing what I want?"

These questions have popped up in many young minds. Being a girl in a society where goddess Durga is worshipped and the very same gender is not safe anywhere is a big worry. While you ponder upon these things a lot more questions, start crossing your mind.

We have heard many young girls complaining about how they don't feel safe even walking over the *"Foot Over Bridge"*. How uncomfortable it is to walk freely post dark, and to imagine that no eyes are set on you is like living in a delusional world. How many of us have to skip some events that might make us stay out late in college! Even if we stayed out late does it not instil us with fear of prying eyes and uncomfortable situations. Well, we have seen many girls backing out of many such events where they could have passed the events with flying colours. Unfortunately, changing every other person out there is practically impossible for us to do, but how can we make the working environment better for women lies completely in our hands.

The easiest and the bare minimum way is to make them safe and recognized in any institution serves as a solution. Being recognized as an equal gender gives a pathway for them to be empowered and instils a feeling of respect amongst everyone. To make our educational institution better for women, we can take the following actions.

First off, what needs to be changed is the mentality regarding the attire of any individual and in this case women especially. We have heard a lot about how a particular dressing way is considered being indecent or provokes the other gender, or rather gives them the liberty to pass on any lewd comments and behave inappropriately. To rule this out completely the students will be given the liberty of wearing anything that suits them and is comfortable in provided they maintain the decorum of a professional educational institution and if any individual, irrespective of their gender and position in the college, is found to pass any derogatory comments about one's attire strict action will be taken against them and might even be suspended immediately. There will be no tolerance for such incidents.

I firmly believe that it is not one's attire that is "inviting," it is the pathetic mindset that finds ways to degrade another person.

Now, even if we can't change every individual out there, what we can do is try to make our girls and women staff capable of fighting back in such situations. Therefore, we will have workshops on self-defence that will be open to all the students and female staff. To ensure more safety,

any cases of harassment will follow severe consequences and will never be treated lightly. No person, be it on any post or position, will be spared for such acts. Proper installation of CCTVs will ensure the safety and well -being of students and staff of the institution.

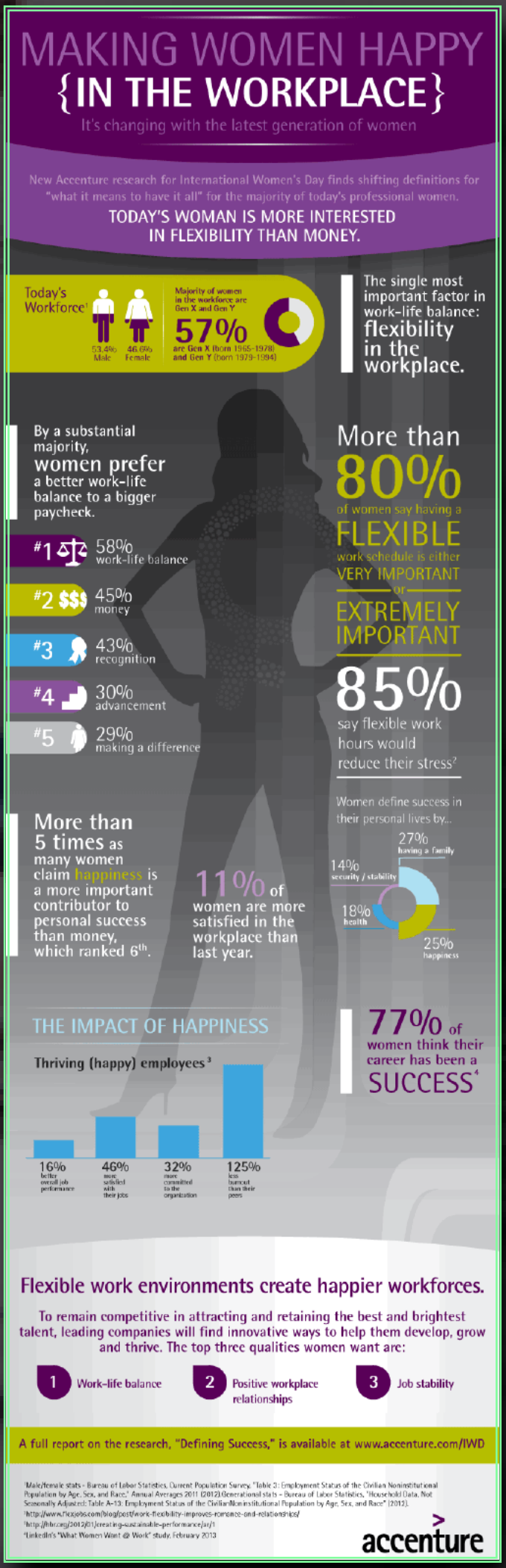
It's not only the issues regarding safety that prove to be a problem. We ladies might have turned out from an event or returned home because of lack of sanitation issues and no supply of sanitary pads in colleges. To ensure that this won't ever happen again and making an institute more friendly for ladies is by ensuring clean sanitation facilities and ample supply of sanitary pads.

Not forgetting the women staff who put in as many efforts as their male counterparts do. There will be no gender-biased pay gap. The institute will promote equality in all senses.

Now wouldn't we need a body where we can address our problems? The introduction of a women's forum will be made so that any women can report their issues and concerns regarding anything. The people handling this department will be listening to all your problems and providing you with a swift, appropriate solution for the same.

There is no limit to what we as women can accomplish.

Let's make it possible for them to be free in the genuine sense. Considering the plight of women's safety and empowerment out in the world, we can do our bit by at least ensuring it in the place where she is working or studying.



GENDER EQUALITY IN TECHNOLOGY

- Yash Mate (CMPN)
Second Place

In 2019, Dr. Debora Sijacki, a computer cosmologist at the University of Cambridge, was awarded the PRACE Ada Lovelace Award for her remarkable contribution to the field of High-Performance Computation. The award, named after Ada Lovelace, who was considered as the first programmer in human history. Ada was truly a visionary and her insightful findings have paved the way for modern programming and she is indeed an inspiring figure for innumerable women who later went on to invent one of the finest creations of mankind. Grace Hopper, who garnered worldwide acclaim as the *'Mother of Computing'* for her incessant toil in devising UNIVAC-1, the first business-oriented machine, her work as one of the lead architects in invented 'COBOL', is second to none. The revolutionary idea of the Graphical User Interface (GUI) was developed by Adele Goldberg, a researcher at Xerox in the 1970s. Optimizing and adding details to the GUI, it was Susan Kare, the chief graphic designer at Apple who was responsible for the signature graphical designs of Apple which are trendy even now.

From pioneering the VFX of Marvel Cinematic Universe (Victoria Alonso), to bringing retro gaming into the limelight (Carol Shaw), the marvelous contribution of women in technology is absolutely mesmerizing. In a country like India, where a large pool of STEM-based positions are occupied by men, the mighty Chandrayaan-2 mission of ISRO was a revelation as Ritu Kharidal, Mission Director and 'The Rocket Woman of India' spearheaded a team of women scientists who have been the testament for the valor, intellect, and persistence. Women in tech have not only brought laurels and accolades to India but have also won hearts of 1.3 billion fellows. The demonstration of technical brilliance is admirable and has a tremendous impact on advancements in research. Gone are the days when the male-dominant orthodox society laid strict doctrines that women needed to follow. Now, women have realized their self-worth and have a sense of independence in both thinking and actions. According to stats, 34% of employees in tech-related in India roles are females. This number seems superlative if compared with the proportion of females in tech professions in Europe (18%) and the USA (25%). This gender disparity particularly arises because of the pre-conceived notion of women being incompetent in tech-related roles which in reality is far from the truth.

On average, male employees are promoted to managerial positions every 6 years whereas females who are equally capable are promoted every 8 years.

This results in women quitting tech jobs and moving to sales, marketing, product management, or consultancy. On the brighter side, organizations like *'Global Fund for Women', 'Ladies Learning Code', 'Girls who code',* and many others

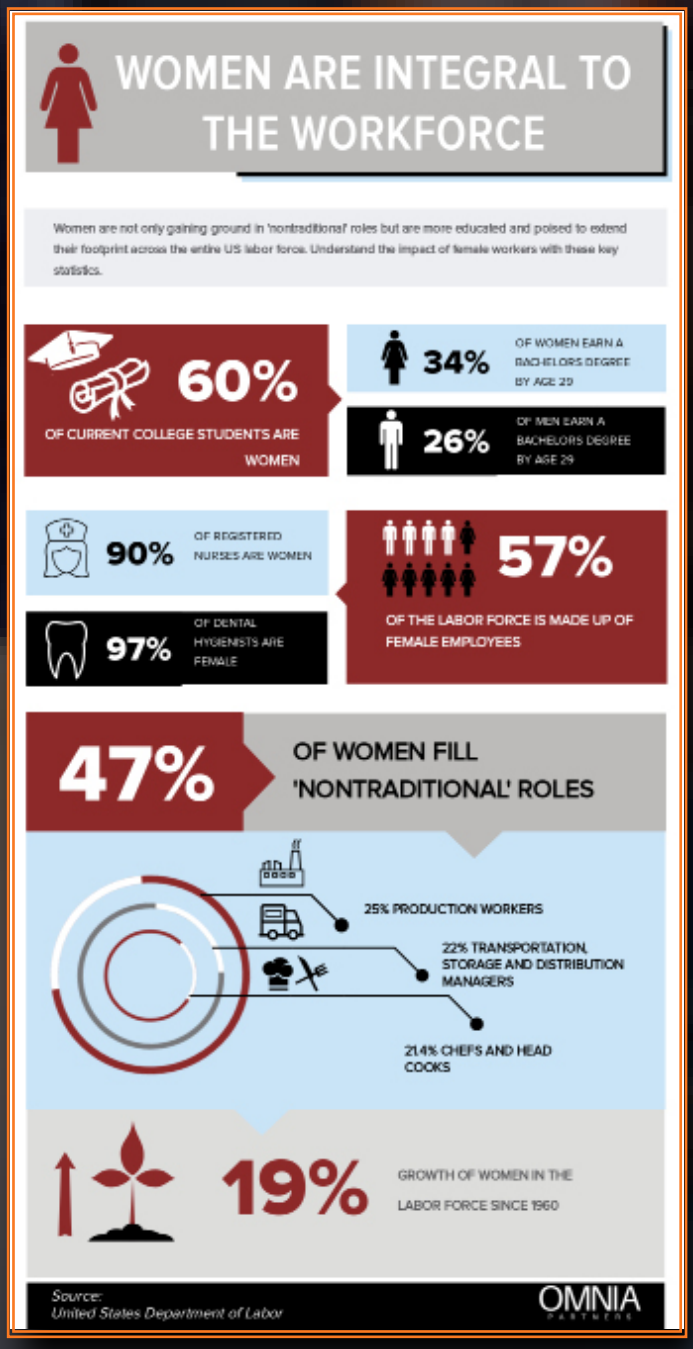
have taken initiative in bridging this gap. Organizations like Amazon, Adobe, ETH Zurich, Warsaw University are offering Women In Technology Scholarships. McKinsey and Company are bolstering gender equality in technology through philanthropy and corporate social responsibility. Women in tech have surged ahead and have made fantastic progress. The world has now started to realize the prominence of women in technology.

"Be the change you want to see in the world"

says Mahatma Gandhi.

Merely addressing the problem is the job half done. Taking concrete steps in the right direction and triumphantly executing them will make it picture-perfect. Mighty world-class organizations like Google and Amazon have taken cognizance of this ever-growing issue and have formulated many progressive policies that we can take inspiration from. Google's Women Techmakers Scholars Program, which awards $10,000 dollars to women displaying exemplary leadership and academic skills and Amazon's WoW program that encourages diversity in Software Development Roles have created a massive impact by touching the lives of countless unwavering women. AICTE's (All India Council for Technical Education) Pragati Scholarship encourages girls to excel in the field of Technology by providing them scholarships of Rs 50,000 per annum is another step to champion this cause. Revising existing reservation policies, devising schemes that empower women whilst financing their education by awarding them scholarships is the need of the hour. As an organization, providing adequate maternity leaves and designing the work-place to include child-care facilities are truly revolutionary endeavors. Educational institutes must adopt radical thinking and organize hackathons, ideation and B-Plan competitions solely for women that are aimed at solving practical female-centric issues. Conducting mentoring sessions to guide them would enkindle in them a burning desire to learn and succeed.

Finally, just keep calm and show them the girl power!



THE WAGE FOR HER SACRIFICE

- Nidhi Nair (INST)
Third Place

It's no secret that the number of women in the workforce or educational institutes lags way behind the number of men, even though the percentage of highly educated women is a lot more. The cause of this problem is present right in our society, our upbringing and the social norms we see on a day-to-day basis. May it be discrimination, lack of opportunities or sexual harassment, these problems have persisted for as long as we can remember. It is also high time that we say our goodbyes to these hurdles that cripple us, women, every day. If I ever had the opportunity to make gender policies for offices or institutes,

I will first do away with the wage gap that burdens many working women and even tramples on their self-esteem.

Many studies over the years have proven multiple times that women make about 30 per cent less than men for the same job. This problem arose from the misogynistic sentiment that the work done by a woman is less valuable than a man's. This problem has also spread into female-dominated jobs like teaching, housework and nursing. These employees are essential and no disaster or pandemic has ever ceased the need for their hard labour. Our teachers and nurses are working tirelessly even with a pandemic brewing in the background. They are overworked and underpaid. This is the fate of many women, struggling with home life and the relentless hours of their jobs only to get a small paycheck that is supposed to make up the innumerable sacrifices they make every day.

A way to decrease the wage gap is to consciously promote equal pay and to create rules for job recruiters and employers. The wage gap is also seen to increase astronomically after a woman reaches her late twenties to early thirties. We can say the cause of this is their absence during pregnancy. Maternity leaves are inevitable as most common folks wish to start families by this age. However, by the time woman have returned to the workspace their peers have already been promoted to higher positions. It is absurd to expect women to give up having families to promote their careers when men can have both.

Having good maternity policies in a company can also be an incentive to increase women in the workplace. Many Nordic countries have normalized giving paternity leaves as well. This has not only helped in maintaining a workplace balance but also helped new fathers just as much as mothers. This also helps men in integrating with their families more and helping around the house. This practice has shown many good results and is being adopted as a necessity by various governments around the world.

Men and women become active workers in the home and at work and a balance is sustained. Eventually, working women will be paid their dues.

SAFE HAVEN

- Arnab Saha (EXTC)
Second Place

"Feminism isn't about making women stronger. Women are already strong, it's about changing the way the world perceives that strength."

Women in the 21st century have become an important topic to discuss that keeps getting ignored. Be it the Parliament of a nation or the four walls of a home, in majority of the situations, they seldom get recognised. The places they do get recognised, the faith in their power is hardly trusted. Women are constantly questioned for the decisions they make while men are hardly ever questioned. In ironic situations like these, there is a big question that arises: *How and when will this change?*

While many international organisations have lauded the strides that the world has taken in providing equal opportunities to women, we are far away from our goal. It's true when we say that women's rights have improved drastically in the last 2 decades as compared to the past 200 years. But "improvement" as a word is not something every woman still relates to in this world. In some parts of the world, the condition has even deteriorated.

There is no fixed answer or a definite approach to create a comfortable environment for women. Many methods have been tried in the past and many frameworks have been put forward for the upliftment. The suggestion here is a top down approach for providing women with better opportunity and equity. The aim with this framework is to ignite that discussion in the places where women are still ignored.

Starting from the top, we have politics. The gap between laws and implementation, between words and action, is among the biggest challenges in our quest to empower women and achieve gender equality. We need to hold government organizations accountable and keep pushing for implementation. A complete overhaul of the National Commission of Women (NCW) is required. It was set up to address the issues faced by women at a national level but has not been quite successful. The appointing of the heads needs a complete reformation and greater power needs to be provided to them.

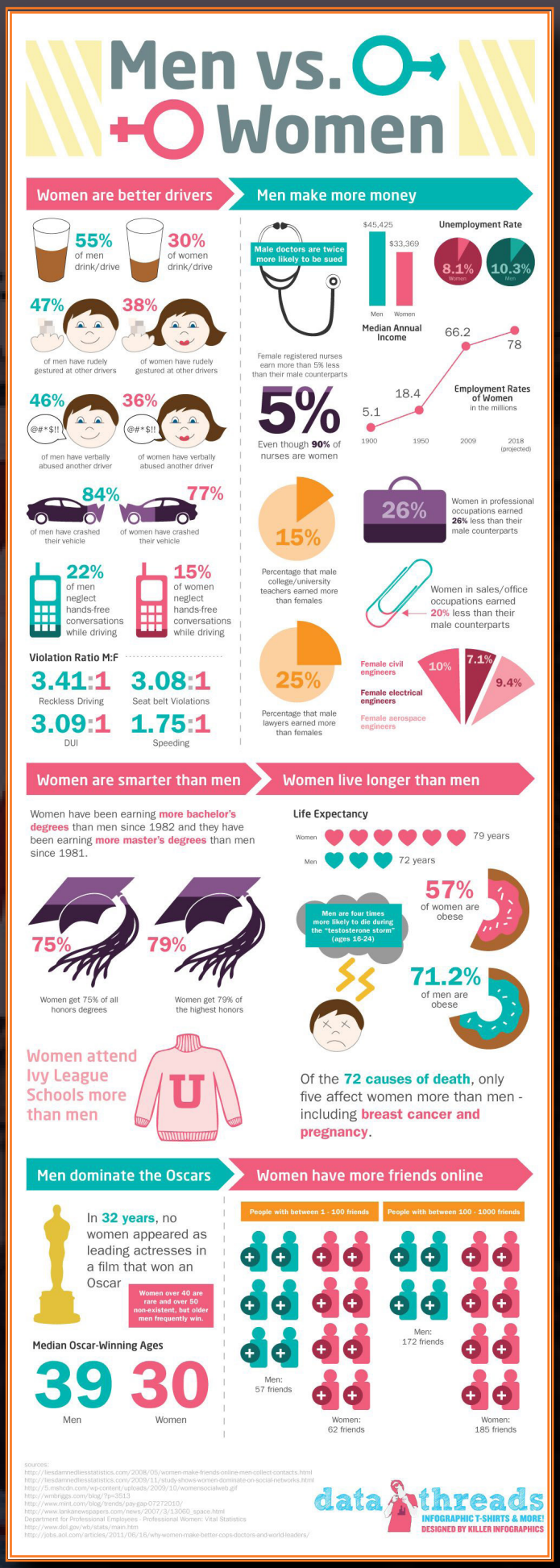
Moving downwards to workplace environments, we need a stricter enforcement of laws to deter sexual predators. For this specific problem, there needs to be a change in the grievances department. More women need to be in the panel that reviews complaints. This is a great system consisting of checks and balances which will further make women feel safer. There is also the issue of the Wage Gap. Women earn less than men for doing equivalent jobs. Many countries have laws in place to prevent women from doing certain jobs, accessing finance, owning businesses or conducting legal affairs. We need inclusive laws and policies that promote civil rights and equal pay.

Now coming down to the grassroots. We need to prevent unwanted pregnancies. In order to achieve this, we need to ensure that girls and women have the information and services they need for sexual and reproductive health to make informed decisions and protect their health and their futures. Secondly, we should seek out ways to stop girls from leaving school. Providing basic facilities like free study material, separate bathrooms for boys and girls goes a long way into solving this issue.

Education and equal opportunity are essential but not enough to end women's dependency and vulnerability, especially for the rural poor.

We have to promote social and cultural norms that perpetuate the view that women and men are equal in worth, dignity and rights and should enjoy mutual trust and respect and shared responsibilities.

We need to work with the media so that the stories people hear and the images they see show intelligent and assured women who are responsible for their lives and their futures. Equally important are modern men and boys who treat women and girls as equals and have zero tolerance for gender-based violence and discrimination. Changing social and cultural norms and attitudes is vital for progress and success for gender equality. The key is universal education and awareness that promotes equality between men and women and upholds human rights and dignity for all.



SPACE EXPLORATION CROSSWORD

Across

4. Small robot that move about on the surface of another planet or moon
5. A place that is empty of all matter
9. Who is said to be the "Father of the Indian Space Program"?
11. A device that expels gas in one direction to move in the opposite direction
12. A spacecraft that collect data but has no crew

Down

1. A large artificial satellite where people live a long time
2. Weightlessness
3. Which is India's first artificial satellite?
6. A reaction force that propels an object forward
7. Where did rocket technology originate?
8. How much do astronauts grow in space? (in percentage)
10. What was the first manned flight around the moon?

Answers: 1 - Space Station; 2 - Microgravity; 3 - Aryabhatta; 4 - Rover; 5 - Vacuum; 6 - Thrust; 7 - China; 8 - Three; 9 - Dr. Vikram Sarabhai; 10 - Apollo 8; 11 - Rocket; 12 - Space Probe.

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