ANTHARIKSH

The Space...

DEPARTMENT OF AEROSPACE ENGINEERING

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

MYLAVARAM, ANDHRA PRADESH, INDIA.

Vision of the Department:

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

Mission of the Department:

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

Program Educational Objectives (PEOs)

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

PROGRAM OUTCOMES (POs)

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

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

PO3: Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct Investigation of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of the information to provide valid conclusions.

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

PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

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

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

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

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

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

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

FOCUS AND SCOPE

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

PUBLICATION FREQUENCY:

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Send your articles to the following mail ID.

E-Mail: anthariksh.lbrce@gmail.com

Disclaimer

FROM HOD's DESK

Take up one idea. Make that one idea your life; dream of it; think of it; live on that idea. Let the brain, the body, muscles, nerves, every part of your body be full of that idea, and just leave every other idea alone. This is the way to success, and this is the way great spiritual giants are produced.

Dr. P. Lovaraju

A NEW IMPLANT FOR BLIND PEOPLE

From the collections of Chief Editor and Editors

"Allí," says Bernardeta Gómez in her native Spanish, pointing to a large black line running across a white sheet of cardboard propped at arm's length in front of her. "*There*."

It isn't exactly an impressive feat for a 57-year-old woman—except that Gómez is blind. And she's been that way for over a decade. When she was 42, toxic optic neuropathy destroyed the bundles of nerves that connect Gómez's eyes to her brain, rendering her totally without sight. She's unable even to detect light. But after 16 years of darkness, Gómez was given a six-month window during which she could see a very low-resolution semblance of the world represented by glowing white-yellow dots and shapes. This was possible thanks to a modified pair of glasses, blacked out and fitted with a tiny camera. The contraption is hooked up to a computer that processes a live video feed, turning it into electronic signals. A cable suspended from the ceiling links the system to a port embedded in the back of Gómez's skull that is wired to a 100 -electrode implant in the visual cortex in the rear of her brain. Using this, Gómez identified ceiling lights, letters, basic shapes printed on paper, and people. She even played a simple Pac-Man–like computer game piped directly into her brain. Four days a week for the duration of the experiment, Gómez was led to a lab by her sighted husband and hooked into the system. Gómez's first moment of sight, at the end of 2018, was the culmination of decades of research by Eduardo Fernandez, director of neuroengineering at the University of Miguel Hernandez, in Elche, Spain. His goal: to return sight to as many as possible of the 36 million blind people worldwide who wish to see again. Fernandez's approach is particularly exciting because it bypasses the eye and optical nerves.

Much earlier research attempted to restore vision by creating an artificial eye or retina. It worked, but the vast majority of blind people, like Gómez, have damage to the nerve system connecting the retina to the back of the brain. An artificial eye won't solve their blindness. That's why in 2015, the company Second Sight, which received approval to sell an artificial retina in Europe in 2011—and in the US in 2013—for a rare disease called retinitis pigmentosa, switched two decades of work away from the retina to the cortex. (Second Sight says slightly more than 350 people are using its Argus II retinal implant.) During a recent visit I made to palm-studded Elche, Fernandez told me that advances in implant technology, and a more refined understanding of the human visual system, have given him the confidence to go straight to the brain. "The information in the nervous system is the same information that's in an electrical device," he says Restoring sight by feeding signals directly to the brain is ambitious. But the underlying principles have been used in human-electronic implants in mainstream medicine for decades. "Right now," Fernandez explains, "we have many electric devices interacting with the human body. One of them is the pacemaker. And in the sensory system we have the cochlear implant."

This latter device is the hearing version of the prosthesis Fernandez built for Gómez: an external microphone and processing system that transmits a digital signal to an implant in the inner ear. The implant's electrodes send pulses of current into nearby nerves that the brain interprets as sound. The cochlear implant, which was first installed in a patient in 1961, lets over half a million people around the globe have conversations as a normal part of everyday life. "Berna was our first patient, but over the next couple of years we will install implants in five more blind people," says Fernandez, who calls Gómez by her first name. "We had done similar experiments in animals, but a cat or a monkey can't explain what it's seeing."Berna could. Her experiment took courage. It required brain surgery on an otherwise healthy body—always a risky procedure—to install the implant. And then again to remove it six months later, since the prosthesis isn't approved for longer-term use.

Seizures and phosphenes

I hear Gómez before I see her. Hers is the voice of a woman about a decade younger than her age. Her words are measured, her cadence is perfectly smooth, and her tone is warm, confident, and steady. When I finally see her in the lab, I notice Gómez knows the layout of the space so well she barely needs help navigating the small hallway and its attached rooms. When I walk over to greet her, Gómez's face is initially pointing in the wrong direction until I say hi. When I reach out to shake her hand, her husband guides her hand into mine. Gómez is here for a brain MRI to see how things look half a year after having her implant removed (they look good). She's also here to meet a potential second patient who is in town, and in the room during my visit. At one point during this meeting, as Fernandez explains how the hardware connects to the skull, Gómez interrupts the discussion, tilts forward, and places the prospect's hand on the back of her head, where a metal outlet used to be. Today there's virtually no evidence of the port. The implant surgery was so uneventful, she says, that she came to the lab the very next day to get plugged in and start the experiments. She's had no problems or pain since. Gómez was lucky. The long history of experiments leading to her successful implant has a checkered past. In 1929, a German neurologist named Otfrid Foerster discovered that he could elicit a white dot in the vision of a patient if he stuck an electrode into the visual cortex of the brain while doing surgery. He dubbed the phenomenon a phosphene. Scientists and sci-fi authors have since imagined the potential for a camera-to-computer-to-brain visual prosthesis. Some researchers even built rudimentary systems.

SPACE TRAVEL CAN SERIOUSLY CHANGE YOUR BRAIN

From the collections of Chief Editor and Editors

It turns out that spending time in space can change your brain (and you might have to be spun around to prevent it).

Researchers have been exploring how spaceflight can affect human physiology and human health for as long as we have been working to launch people to space. For example, the groundbreaking Twins Study uncovered a multitude of ways that space changes our bodies — even our gene expression!

But one new study suggests that spaceflight could affect the human brain in strange and unusual ways, which could impair astronaut eyesight and last for a long time. Since the days of the shuttle program to today, astronauts have reported issues with vision after traveling to space. Medical evaluations on Earth have revealed that astronauts' optic nerves swell and some experience retinal hemorrhage and other structural changes to their eyes. Scientists suspect that these vision issues are caused by increased "intracranial pressure," or pressure in the head, during spaceflight. In a new study led by Dr. Larry Kramer, a radiologist at the University of Texas Health Science Center at Houston, researchers have found evidence that this pressure does, in fact, increase in microgravity.

In this study, the team performed brain MRI (magnetic resonance imaging, a technique that uses specialized scanners to image parts of the body using magnetic fields) on 11 astronauts (10 men and one woman) both before and after they traveled to space and for up to a year after their return. These MRI images showed that, with long-duration exposure to microgravity, the brain swells and cerebrospinal fluid, which surrounds the brain and spinal cord, increases in volume. These findings support the theory that spaceflight increases pressure in the head which researchers think could be tied to issues with astronaut vision, Kramer told Space.com.

Additionally, Kramer and his colleagues found that the pituitary gland, also changes with exposure to microgravity, Kramer said. They found that the gland became compressed, it changed in height and shape which, as Kramer said, this is a sign of increased pressure in the head. The researchers also found that these effects, the swelling of the brain alongside the compressing pituitary gland and the pressure in the head, was still present a year after the astronauts returned from space. That duration suggests that these effects could be long-lasting, Kramer said. However, further study is needed to evaluate exactly how microgravity affects the brain over an astronaut's lifetime and how this might vary between people, Kramer said.

Scientists have a number of theories about why the brain swells in space, but what Kramer called "one of the most compelling," is that without gravity, the fluids in our body that usually circulate evenly travel up toward the head and away from the feet, he said. "The blood that normally pools in the extremities redistributes toward the head," he said. "It's not something that we normally experience on Earth unless you're sort of standing on your hands."

Researchers are also working to develop what spaceflight experts call "countermeasures," or techniques that could be used to reduce these negative effects.

To test countermeasures, research subjects are put on bed rest with their heads tilted downward to simulate the fluid shift scientists believe happens in microgravity. In this position, researchers have found that the optic nerve swells and seen other physical effects that are also seen in spaceflight. "If we can prevent those [effects] in the bed-rest studies, then potentially we can prevent those in microgravity," Kramer said. One of the countermeasures that researchers are experimenting with is reminiscent of the revolving space station in the sci-fi film "2001: A Space Odyssey," Kramer said. The countermeasure would "spin an astronaut around for a certain portion of the day, just moving the blood through the body and back towards the legs," like an artificial gravity, Kramer said. Another countermeasure scientists think may help is a specialized suit for the feet and legs that would help to maintain their fluid levels. The work is described in a paper published today (April 14) in the journal the Radiological Society of North America.

SPACEX RETURNS 4 ASTRONAUTS TO EARTH, ENDING 200-DAY FLIGHT

From the collections of Chief Editor and Editors

Their capsule streaked through the late night sky like a dazzling meteor before parachuting into the Gulf of Mexico off the coast of Pensacola, Florida. Recovery boats quickly moved in with spotlights.Four astronauts returned to Earth on Monday, riding home with SpaceX to end a 200-day space station mission that began last spring.

Their capsule streaked through the late night sky like a dazzling meteor before parachuting into the Gulf of Mexico off the coast of Pensacola, Florida. Recovery boats quickly moved in with spotlights. “On behalf of SpaceX, welcome home to Planet Earth,” SpaceX Mission Control radioed from Southern California.

Their homecoming _ coming just eight hours after leaving the International Space Station _ paved the way for SpaceX’s launch of their four replacements as early as Wednesday night. The newcomers were scheduled to launch first, but NASA switched the order because of bad weather and an astronaut’s undisclosed medical condition. The welcoming duties will now fall to the lone American and two Russians left behind at the space station. Before Monday afternoon’s undocking, German astronaut Matthias Maurer, who’s waiting to launch at NASA’s Kennedy Space Center, tweeted it was a shame the two crews

wouldn’t overlap at the space station but “we trust you’ll leave everything nice and tidy.” His will be SpaceX’s fourth crew flight for NASA in just 1 1/2 years.

NASA astronauts Shane Kimbrough and Megan McArthur, Japan's Akihiko Hoshide and France's Thomas Pesquet should have been back Monday morning, but high wind in the recovery zone delayed their return.

"One more night with this magical view. Who could complain? I'll miss our spaceship!" Pesquet tweeted Sunday alongside a brief video showing the space station illuminated against the blackness of space and the twinkling city lights on the nighttime side of Earth.

From the space station, NASA astronaut Mark Vande Hei — midway through a one-year flight — bid farewell to each of his departing friends, telling McArthur "I'll miss hearing your laughter in adjacent modules."

Before leaving the neighborhood, the four took a spin around the space station, taking pictures. This was a first for SpaceX; NASA's shuttles used to do it all the time before their retirement a decade ago. The last Russian capsule fly-around was three years ago. It wasn't the most comfortable ride back. The toilet in their capsule was broken, and so the astronauts needed to rely on diapers for the eight-hour trip home. They shrugged it off late last week as just one more challenge in their mission. The first issue arose shortly after their April liftoff; Mission Control warned a piece of space junk was threatening to collide with their capsule. It turned out to be a false alarm. Then in July, thrusters on a newly arrived Russian lab inadvertently fired and sent the station into a spin. The four astronauts took shelter in their docked SpaceX capsule, ready to make a hasty departure if necessary. Among the upbeat milestones: four spacewalks to enhance the station's solar power, a movie-making visit by a Russian film crew and the first-ever space harvest of chile peppers.

The next crew will also spend six months up there, welcoming back-to-back groups of tourists. A Japanese tycoon and his personal assistant will get a lift from the Russian Space Agency in December, followed by three businessmen arriving via SpaceX in February. SpaceX's first privately chartered flight, in September, bypassed the space station.

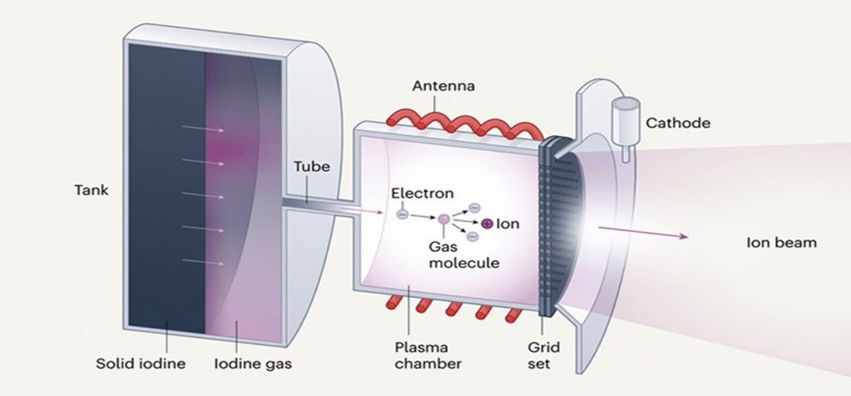
NEW ELECTRIC PROPULSION ENGINE FOR SPACECRAFT TEST-FIRED IN ORBIT FOR FIRST TIME

From the collections of Chief Editor and Editors

For the satellites spinning around Earth, using electricity to ionize and push particles of xenon gets them to go where they need to go. While xenon atoms ionize easily and are heavy enough to build thrust, the gas is rare and expensive, not to mention difficult to store. Thanks to new research, we could soon have an alternative. Enter iodine.

Full in-orbit operation of a satellite powered by iodine gas has now been carried out by space tech company ThrustMe, and the technology promises to lead to satellite propulsion systems that are more efficient and affordable than ever before. "Iodine is significantly more abundant and cheaper than xenon, and has the added advantage that it can be stored unpressurized as a solid," says Dmytro Rafalskyi, the CTO and co-founder of ThrustMe. While earlier ground-based tests of iodine propulsion engines had been promising, getting it working in space is the clearest sign yet that this can be the future of small-scale spacecraft engines – and that our exploration of space can practically continue.The team used iodine to fuel a 20 kg (44 pound) CubeSat satellite with an engine named the NPT30-I2, which was launched on 6 November 2020. Maneuvers were carried out successfully, and iodine was shown to achieve higher ionization efficiency than xenon too.

Besides the benefits we've already talked about, iodine-based systems could also be built in significantly smaller and simpler forms than current satellites: unlike xenon and other propellants, iodine can be stored



on board in its solid form before it's converted into a gas, so there's no need for bulky, high-pressure gas tanks.

"The successful demonstration of the NPT30-I2 means we can proceed to the next step in the development of iodine propulsion," says Rafalskyi. "In parallel with our in-space testing we have developed new solutions allowing increased performance and have commenced an extensive ground-based endurance testing campaign to further push the limits of this new technology."

Tens of thousands of satellites are expected to be launched into orbit across the next decade, so finding ways to make them as efficient and as affordable as possible is key if we're to keep on exploring and analyzing Earth and the Universe around us. The use of iodine in making satellites more affordable, more efficient and more compact has multiple potential benefits in how satellite constellations can be deployed, trained to avoid each other, and disposed of when they've reached the end of their useful lives.

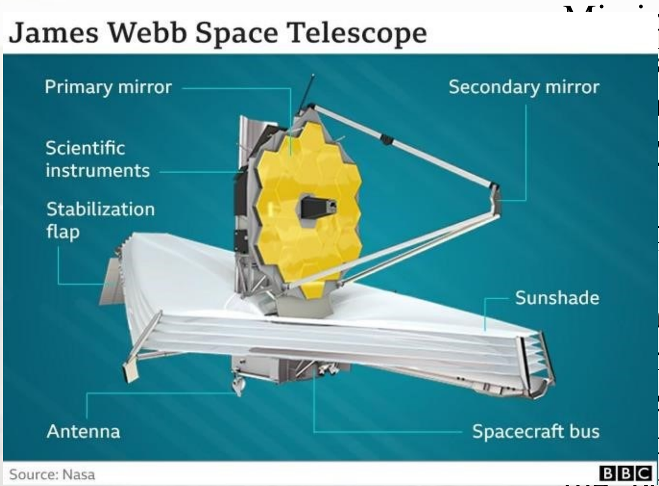
Challenges remain: iodine is highly corrosive, which means ceramics are required to protect the satellite parts, and at the moment iodine engines aren't as responsive as their xenon counterparts. However, this is a major step forward for the technology. "Publication of these historic results is not only important for ThrustMe, but also for the space industry in general," says ThrustMe CEO and co-founder Ane Aanesland. "Having our results peer-reviewed and publically accessible provides the community with further confidence and helps to create a benchmark within the industry."

JAMES WEBB SPACE TELESCOPE

M.SOWJANYA
20761A5634

The James WEBB Space telescope (JWST) is a space telescope developed by NASA with contributions from the European Space Agency (ESA), and the Canadian space agency(CSA). The telescope is named after James E.Webb who was the administrator of NASA from 1961 to 1968 and played an integral role in the apollo program., It is intended to succeed the hubble Space Telescope as NASA's flagship mission in astrophysics. JWST was launched 25 December 2021 on Ariane flight VA256.It is designed to provided improved infrared resolution and sensitivity over hubble, viewing objects up to 100 times fainter and will enable a broad range of investigations across the fields of astronomy and cosmology, including observations up to redshift z ~20 of some of the oldest, most distant, events and objects in the universe such as the first stars and formation of the first galaxies, and allowing detailed atmospheric characterization of potentially habitable exoplanets. JWST's primary mirror, the optical telescope element, consists of 18 hexagonal mirror segments made of gold-plated beryllium which combine to create a 6.5meter (21ft 4inch) diameter mirror. This gives webb's telescope a light collecting area about 5.6 times as large as hubble's 2.4m(7.9ft) mirror (25.37m^2 collecting area to hubble's 4.525m^2).unlike hubble, which observes in the near ultraviloet, visible, and near infrared (0.1-1.0um) spectra, JWST will observe in a lower frequency range, from long-wavelength visible light (red) through midinfrared (0.6-28.3um). This will enable it to observe high-redshift objects that are too old, faint, and distant for hubble. The telescope must be kept below 50k(-223°c; - 370°F) to observe faint signals in the infrared without interference from any other sources of warmth, so it will be deployed in space near the Sun-earth L2 lagrange point, a point in space about 1.5 million kilometers (930,000mi) from earth, where it's 5layer kite-shaped sunshield can protect it from warming by the sun, earth and moon at the same time.

The NASA Goddard space flight center (GSFC) in Maryland managed the development and the space Telescope science Institute is operating JWST. The prime contractor was northrop Grumman.. Development began in 1996 for a launch that was initially planned for 2007 with a US$500 million budget.there were many delays and cost overruns, including a major redesign in 2005,a ripped sunshield during a practice deployment, a recommendation from an independent review board, the covid-19 pandemic, issues with Ariane 5 rocket and the telescope itself, and communications issues between the telescope and the launch vehicle. The high-stakes nature of the launch, which is the planned backbone of the next generation of research in its fields, and the telescope's required complexity, was remarked upon by the media, and commented on by scientists and engineers.



Construction was completed in late 2016,when an extensive testing phase began. JWST was launched 12:20 UTC 25 December 2021,by an Ariane 5 launch vehicle from kourou, French Guiana and was released from the upper stage 27 minutes later. The launch was described by NASA as "flawless" and "perfect". As of january 2022,the telescope has been fully and successfully Unfolded to its operational configuration, and continues to travel to its target destination. It will take several weeks to cool to its operational temperature, and will then undergo final testing and calibration procedures for around 5months, potentially including its first images, before commencing its planned research program.

PARKER SOLAR PROBE ENTERED THE SOLAR ATMOSPHERE

N MEENA MAHITHA
20761A5638

Sun, the giant star with no solid surface but filled entirely with hot plasma and strong magnetic field is hard to be reached by anyone and anything. But the Parker solar probe has been part of this miracle and a giant leap in solar science. "Parker solar probe touching the sun is a monumental moment for solar science and a truly a remarkable feat ", Said Thomas Zurbuchen, the associate administrator for the Science
on Directorate at NASA Headquarters
ashington.Parker solar probe was
ed in 2018 by NASA to explore the
y traveling closer to it, after three
from the launch and decades from
ption it has now reached the first mile
on 14th December,2021. As the sun
e superheated atmosphere made of
material bound to it by its gravity and
tic field as rising heat and pressure
he material from the sun it crosses
point where the magnetic fields are weak. The very point is the end of solar atmosphere and beginning of the solar wind. This point is known as Alfvèn critical surface. Until now, the researchers

are unsure about the exact distance of Alfvèn critical surface from sun. Based on remote images of corona, they estimated it to be somewhere around 10 to 20 solar radii from the solar surface. On April 28, 2021, during its eighth flyby of the Sun, Parker Solar Probe encountered the specific magnetic and particle conditions at 18.8 solar radii (around 8.1 million miles) above the solar surface that told scientists it had crossed the Alfvén critical surface for the first time and finally entered the solar atmosphere. Corona, the sun's atmosphere is 300 times hotter than the photosphere, which is one of the mysteries of the sun. During the flyby, Parker Solar Probe passed into and out of the corona several times. This is proved what some had predicted – that the Alfvén critical surface isn't shaped like a smooth ball. Rather, it has spikes and valleys that wrinkle the surface. Discovering where these protrusions line up with solar activity coming from the surface can help scientists learn how events on the Sun affect the atmosphere and solar wind. Once, when is beneath 15 solar radii, probe transited a pseudostreamer. These are the massive structures that rise above the sun's atmosphere. It felt like flying into the eye of a storm. There was a dramatic change inside, like the particles quieted, number of switchbacks dropped. This was the first time, the spacecraft experienced the strong magnetic field enough to dominate the movement of the particles in there.

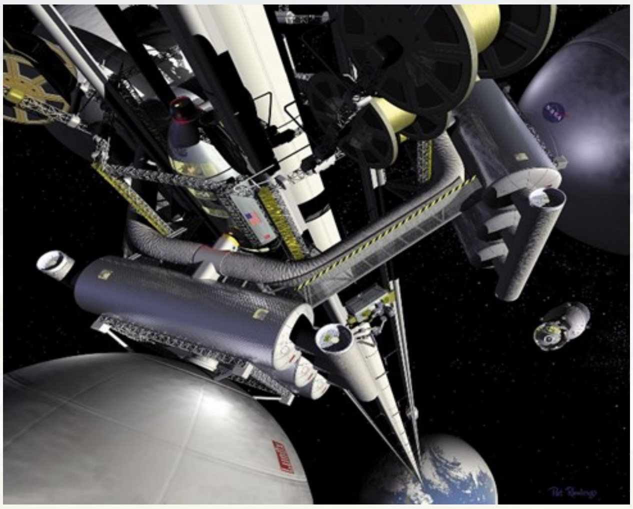
Parker solar probe encountered and collected data pinpointing the origin of zigzag shaped strictures in solar wind, known as switchbacks. From the mid 1990s when the scientists first discovered the s-shaped kinks, thought these are rare, until 2019, at 34 solar radii from sun, parker confirmed that switchbacks are not occasional but are common in solar winds. The new findings confirmed that the origin is the photosphere and they contain high percentage of helium. As it goes deeper and closer to the giant ball of heat, we get know more and better. There are many more yet to be studied and confirmed from the process of formation of switchbacks to the reason behind the temperature of corona being higher than the photosphere. "It's really exciting to see our advanced technologies succeed in taking Parker Solar Probe closer to the Sun than we've ever been, and to be able to return such amazing science," said Joseph Smith, Parker program executive at NASA Headquarters. "We look forward to seeing what else the mission discovers as it ventures even closer in the coming years."

SPACE ELEVATORS

MANOJ KUMAR PASAGADUGULA
18761A2139

Our future in space depends upon many factors: our continued ability to pay for research, development, and missions; discovering new and innovative ways to reach orbit that are more efficient; and ensuring educational opportunities in STEM subjects to foster the upcoming generations of space and rocket scientists to name just a few. Being able to take mass from the surface of Earth, out of our gravity well and into zero-G orbit has always been one of the most expensive pieces of the puzzle. It takes enormous sums of energy, and therefore fuel and money, to get even a few pounds of something into space. What we've been doing so far is firing large rockets, already heavily-laden with tons of fuel, up through the atmosphere, each one carrying a payload that is tiny in comparison to the mass of the fuel and rocket. It's been inefficient, to say the least. One of the ways that many engineers believe is a viable alternative is for us to build space elevators. These aren't elevators in the conventional sense of course. While SEs will indeed move objects up and down, it is more useful to think of them as railroads.An SE would be a gigantic tether cable that reaches from the ground to a point at least 22,000 miles above Earth (with some plans stretching as far out as 62,000 miles) to a space station that acts as a counterweight in geostationary orbit. The power of the Earth's spin will be what keeps the SE straight, pointing out at the stars, via centrifugal force. Elevator "cars", what we'll call climbers, would move up and down the tether via electrical power to carry cargo and people to and from orbit.

The advantages to using SEs as opposed to traditional rocketry would be many. SEs could reduce the cost of sending mass into space from roughly $10,000 per pound to only $100 per pound. SEs, once proven, would likely be much safer than rocket travel for humans: The journey skyward would be slower, but there wouldn't



be high-G forces to wreak havoc on organic or inorganic cargo. And cargo capacity would be far greater than any rocket could ever manage. The origins of the SE idea might be traced back to Soviet Russian rocket scientist Konstantin Tsiolkovsky, who first wrote about the concept as early as 1895. Alongside Goddard and Oberth, Tsiolkovsky is one of the godfathers of rocket science. Tsiolkovsky's proposal was basically a tower built so high it reached outer space. Our modern idea of a space elevator really comes from Yuri Artsutanov, another Russian scientist, who in 1959 conceived of a "tensile structure" that would be held in place via centrifugal force. Aside from the sheer cost of building an SE structure in its totality, the primary hurdle is for our modern R&D to settle on the strongest and lightest material possible with which to construct the tether. Carbon nanotubes are commonly viewed as a best option, but there are other possibilities: silicon carbide, silicon nitride, and silica nanowires. Space elevators will be comprised of 6 major sections: the ground station, the tether, the counterweight, the space station, climbers, and climber power sources. The counterweight must be positioned at the furthest end of the tether, while the station itself would be located at a point where there is an equal amount of mass above it as below. The power sources driving the climbers on their high-altitude treks will likely be a combination of lasers and solar cells. It is also probable that by the time the carbon nanotube construction technology becomes feasible we would also be able to use fusion reactors to power SEs. Multiple trips up and down an SE can be made in a single day. In addition, an SE would require far fewer personnel overall to staff on a regular basis than a rocket launch base. One journey by a climber can also result in multiple opportunities for various parties, since the climbers will take cargo and people to four major points of egress. As a climber rises through the upper atmosphere and past low Earth orbit, objects such as weather stations and satellites can be jettisoned at points where they can enter stable orbits. These objects might not have enough velocity to maintain an orbit, however, and would therefore need some added acceleration capability, such as a small liquid-fuel cryogenic rocket engine. At the space station, more cargo and personnel can exit and utilize shuttle transport to other space stations. In addition, the tether can continue well beyond the space station and toward the counterweight, accelerating objects to greater speeds and then sending them on to much farther destinations such as the Moon, Mars, asteroid belt, and beyond.

Student placements :

In INFOSYS

NAME	REDG NO.
K. PREETHAM RAJ	18761A2123
SYAMALA DINESH REDDY	18761A2147
P. MANOJ KUMAR	18761A2139
DEVI CHATHURYA	18761A2114
GADI SRI SATYA ASWANI	18761A2116
K. BHARATH GANESH	18761A2120

In WIPRO

NAME	REDG NO.
T. AJAY KUMAR	18761A2150
M.V.S PAVAN KALYAN	18761A2133

In SUTHERLAND

P. MANOJ KUMAR	18761A2139
B. SAMUEL MORRIS	18761A2108
S. CHARANYA	18761A2146

ANTHARIKSH

THE SPACE...

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