A Simplified Guide To Rocket Science and Beyond – Understanding The Technologies of The Future

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Abstract: Rocket science has always been fairly complex. Its not because, it deals only the properties of rocket dynamics, attitude control, propulsion systems but the complexity arises mostly as a result of its payload, whether its manned or unmanned, how to make that payload reaches to orbit? How to assemble them in orbit to make giant structures like space stations? And most importantly, the mechanisms and aerodynamics of the shuttle associated with the lifting of the rocket. This paper, not only helps to make ease out the complex terminology, rigorous mathematics, pain stroking equations into a simplified norms, like a non-fiction for the general readers but also, no pre-requisite knowledge in the field is needed to study this paper. However, every possible attempt have been make to simplify the dynamics of rocket sciences and control mechanisms to the most easier way that one can imagine, still, there are some complex terminologies but pictures are provided deliberately with facts and histories to boost up the way of understanding the subject much more better than before. It has been deliberately proved in this paper that rockets along with orbital mechanics, Kessler's syndrome, Lunar and Martial landing of the Apollo and the Curiosity rovers, is not the future of the humanity to reach out to the stars. Therefore, to eliminate time completely, to warp the space in a new way, to make the gravity constant at 1g Earth gravity, physics of Electrohydrodynamics – Or, the physics beyond the rocket propulsion by harnessing the Anti-Gravity is discussed in details with various types of engines and experiments carried out throughout the globe. Just as a rocket become incapable of taking humans to some exoplanets millions of light years apart, Electrohydrodynamics have shown humanity hopes that, this can be achieved by applying clever physics by eliminating the hindrances of time, gravity, acceleration and fuels. Thus arrives the need to consider a totally different form of propulsion technology unknowingly discovered by Tesla and later put forward by Thomas Townsend Brown. The technology of the super-intelligent humans that the Earthmen have gathered by reverse engineering the crashed Unidentified Flying Objects which involves the perpetual motion mechanism of Anti-Gravity governed by Semi-Quantum Kinetics.

Keywords: Rocket Dynamics, Rocket Propulsion, Attitude Control, Orbital Mechanics, Space Shuttle, Electrohydrodynamics, Anti-Gravity.

I. Introduction

There is an inert tendency to get afraid while hearing the term "Rocket Science", as if, it's the most dreadful and difficult science ever produced by humanity as of now. Therefore, young readers who used to watch the live 'launching of space-crafts with or without space shuttle' sometimes delve into Wikipedia or other book stores about the books on "Rocket Science and Engineering" or more specifically "Space-Craft Systems Engineering". Without much ado, I can safely say that by turning some random pages, and watching those monstrous equations and ugly terminology, many of them, leave the book in the 'cart' without even trying to 'check out'.

Me being a mathematical physicist, working on high-energy physics, theoretical (relativistic) cosmology and specifically electrohydrodynamics, have found the topic "Rocket Science" extremely interesting and upon reading a handsome number of books, I digested most of it, this might be due to my intense study practice and patience along with exposure to difficult mathematics over the years, but, of course, I won't expect the readers to go through much of a hackle while dealing with this subject, more to say that 'keeping items, as it is in the cart'.

Therefore, I thought of 'Why not make the science of rocket dynamics a lot easier for the newbie's without any prior knowledge to the physics?'. So, this results in my humble attempt to write this paper. Rocket deals with extremely complex and interdisciplinary subjects like heliophysics, space weather, celestial mechanics, orbital perturbations, propulsion systems which comes in many forms, payloads both manned and unmanned, international space stations, rovers roaming on planets indulging the facets of robotic engineering's and many more to say to complete the list.

To make a subtle version of rocket science, it is not possible to include each and every details and aspects, but still I have tried my best in putting the most crucial ones to make the readers creating a picture in their mind about the complex subject in a very easy approach. This results in creating this paper.

I hope that I have made every aspects simplified and I have omitted every mathematical rigorous stigmas associated with this particular branch of space-craft dynamics. But, I firmly believe that reading this paper carefully and completing it in a single go, or rather in a few go, the reader may acquire enough knowledge to delve into some difficult and advanced books that are available at the market.

While delving deeper into this paper, one thing will become clear to the readers that conventional rocket science is not enough if we humans are planning for a voyage to distant stars. Therefore, we have to think something different, something non-conventional, something out of the box, so that if we aim for reaching a starts 1 million light years away that is, 10^6 years, then travelling with almost the speed of the light, which is $3 * 10^5$ Km/Sec will take 10^6 years to reach to that star. Kepler telescope has already give hints of more than 40,000 exoplanetary systems in a small patch of the Milky Way galaxy. So, neither we have fuels for that long journey, nor we would survive in that long journey. So, the alternative is to break the universal speed limit of light, but there also lays a serious problem, that is, relativity can't be violated. So, its essential to seek for some substitute mechanisms. One among them is the WARP DRIVE proposed by Alcubierre, and that also hints a large amount of exotic matter or negative energy, which still now unavailable to physicists. Thus, we will dive into a technology called Electrohydrodynamics which is beyond the conventional rocket propulsion technology and which violates the 3^{rd} laws of motion of Newton's, the theory of relativity, the 1^{st} and second laws of thermodynamics. This technology is not new, its been there since 1894 when Nicola Tesla got its first hint and later discovered by Thomas Townsend Brown in his several works with the USA defense sectors. However, although being a technology to stand out in the limelight, governments made it classified with very less exposure to the general public and researchers. Thus, as a means of 'beyond the rocket propulsions to reach to the stars', we will be discussing about the theoretical aspects of this Anti-Gravity Technology/Electrohydrodynamics called as Semi-Quantum Kinetics with a hope of reaching to the stars.

Hence, wishing for an easy and wonderful read with a hope that my efforts will not go in vain, I dedicate this paper to the young learners with enthusiastic minds.

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II. History Of Flight

A Giant leap in human civilization came when Men have finally succeed to conquer the science of aerodynamics or to rule the sky. Without this we can't fly jets, rockets or satellites – Even not shuttles or choppers. The contribution goes to the Wright Brothers. Their skill, their hard work, their passion, their intelligence has made the world to succeed in the extraordinary path of space-age. On December 17, 1903, Wilbur and Orville Wright made four brief flights at Kitty Hawk with their first powered aircraft. The Wright brothers had invented the first successful airplane. And this marks the beginning of a manmade object to hover in the air. This marks the birth of heavier-than-air aircraft like aeroplane, the associated aerodynamics and eventually the rocket science.

Figure 1: The first powered, controlled, sustained airplane flight in history. Orville Wright, age 32, is at the controls of the machine, lying prone on the lower wing with hips in the cradle which operated the wing-warping mechanism. His brother, Wilbur Wright, age 36, ran alongside to help balance the machine, having just released his hold on the forward upright of the right wing. The starting rail, the wing-rest, a coil box, and other items needed for flight preparation are visible behind the machine. (Orville Wright preset the camera and had John T. Daniels squeeze the rubber bulb, tripping the shutter) *Data and picture courtesy: John T Daniels, Wikipedia.*

Not only humans rested after discovering the aerodynamics of flight but also they dreamed of a journey to reach out to the stars. Germans have already experimented rockets earlier than Goddard, but the pitfall of German's rocket is that, they all are made of solid propellants. The main disadvantage of solid propellants is that, once its ignited, it will not stop unless its exhausted or burned out. But, this is not at all suitable for space applications as in space rockets need to be maneuvered, they need to coast, they need to fire in short bursts, they need to fire in different thrusts. Although solid propellants are necessary for the rocket to reach the KARMAN LIMIT (100 Km above the sea level) by means of several strap-on's but the ultimate fate of the rockets propulsion is based on something that can be ignited, stopped and again ignited as per the needs, that is, a

controlled thrust mechanism. On March 16, 1926, Robert H. Goddard discovered the first modern liquid propellant rockets with gasoline as the fuel and oxygen as the oxidizer that meets in a combustion chamber for producing thrust. On a winter morning, in a snowy field outside Worcester, Massachusetts, Goddard's rocket rose at a height of 41 feet before getting smashed upon an impact.

Figure 2: Goddard with his rocket on March 8, 1926, in Auburn, Massachusetts. (*Courtesy: https://airandspace.si.edu/stories/editorial/robert-goddard-and-first-liquid-propellant-rocket*)

III. The Science To Fly Into Space

ROCKET SCIENCE WITH APPLICATION TO

✓ ROCKETS WITHOUT SPACE SHUTTLE
✓ ROCKETS WITH SPACE SHUTTLE

We are now living in the space age where the possibility of interstellar travel is beginning to shed new light in the eyes of the theoretical and experimental physicists. Space enthusiastics are getting larger day by day. Space tourism is beginning to be a potential candidate for humankind. Large payloads such as heavy satellites are placed in the orbits both geostationary and sun-synchronous to observe the distant planets and nebulae along with GPS and mapping of terrestrial field, crop plantation, missile interception, studying sun, studying the information systems along with a large scale application of military data handling with satellite telephone systems. Space-Stations have been developed by carrying payloads in the low earth orbit and assembling them by the astronauts in Extra Vehicular activity. The famous example is the ISS or The International Space-Station. Planning is calibrating on building high scale Megastructures in Space to protect humanity in case of mass destruction. Science-Fiction is not so far ahead. Dyson Spheres will be built soon enough to harness energy from the Sun. To harness solar energy directly from the Sun by application of a large solar disc and then after it has been successfully completed, humans will prepare themselves for making a new device to harness the energy not only from a single star like sun but also from a collection of many thousands stars of the milky way. Now a days, beside sending manned vehicles and satellites to the space, unmanned vehicles of sophisticated techniques engineered with a high level of accuracy has been applied to send probe to our neighbor planets. These probes can be advantageous to mankind as they are robotic in nature and therefore it can travel along the surface of the planets and examined the soil for the discovery of bacteria or other living organisms along with a meteorological rock study with the implication of the adverse solar radiation and its harmful effects on the human kind. These technologies have been made possible, for, giving necessary guidance to the Earthman's that what precautions needs to be taken for the humans if they travel to those nearby planets. Besides all these, it has been researched to attach a cable from earth to space directly in low level orbits about 300-350 kilometers for smooth transferring of payloads to the space stations at a cheaper way with a short period of time by avoiding the complexities of rocket mechanics and related fields. Material engineers are struggling to find a suitable material for such a cosmic cable that can withstand immense stress and strain along with space hazards if arises any. Moreover, in order to avoid the complexity of the orbital maneuvers and coasting for a longer period of time in space, in order to get the appropriate window of orbital transfer to distant planets, a base is theoretically studied to get established in the moon, our satellites. If we can successfully build a base in moon, then from there we can move to higher planets. This base should also contain many advantageous tasks like rocket refueling, payload eliminating and so on.... As Probes on Alien planets has been already sent, scientists are now thinking of establishing artificial structures in those planets namely Mars where the astronauts can stay and examine the neighborhood for a better understanding of the planetary condition. Those houses should be artificially Gravitated and pressurized in order to provide a life-like conditions for mankind. There will be also several layers of protective sheath surrounding those houses as because the cosmic radiation and high energy cosmic ions can cause health hazard to humans. There will be artificial plantation from which we can get oxygen along with sufficient payloads of food and scientific instruments and other arrangements for a healthy living. Astronauts can spend about 6 months to 1 year in those Planetary-Space-Stations where there will be a permanent base for the returning capsule. The way in which it works like this – There will be a Capsule situated all the time in Those Planets where the future human base will be, then when these capsules are ignited then they will move up beyond the planetary atmosphere and joined with another module orbiting the planet. The module plus the capsule will make an orbital transfer in order to get back to the high earth orbit, then low earth orbit and finally descending on the oceans where Earthman's should retrieve them from the module. Space-Shuttles have already been developed by some countries including USA and Russia. Those shuttles are very useful in satellite or payload deployment in the earth orbits and returning to Earth. Reusable launch vehicles are designed to minimize the cost of space travel. As on one end the distance of navigation gets increased, the other end focuses on minimizing the cost and thereby making the space journey within the reach of humankind. One method that has already been studied and experimented is the GRAVITATIONAL ASSIST in which just like the vectors laws of addition, the spacecraft while passing from a surrounding planet will automatically absorbs its speed and gets a boost. This has already been proved helpful for minimizing the fuel and the time of the reach of destination. As it's not possible to carry large space stations by a rocket as a payload fairing, therefore, it can be plausible and advantageous to build and assemble a large scale space station into space by accumulating smaller payloads by consecutive shuttles or rockets. They can also be made to act as a bridge of interplanetary exploration. But will all the increase in knowledge about space and the advancement of technology, our space journey must not be limited to the neighboring terrestrial planets or their satellites, it needs to be extended to the far away stars and thereby making it as interstellar flight. Space journey should be from one exoplanets to another exoplanets at such a high speed of that of light that time itself will be frozen as per relativity. Like, take an example, if 200 years passed on Earth, then only 2 years have passed for the spacecraft. This leads to time dilation which is very advantageous and is documented in many science fiction movies and novels. But although this all seems to be a very far-reached future possibility which may or may not even happen, one crucial importance is to map our universe or the observable universe with an acute precision so that each and every objects location and distance of them with respect to earthly coordinates can be measured. A 3D MAP may be more beneficial. A 3D map like a projection through which humans will get an ATLAS like guide to the entire universe as far as it has been observed. Although our recent technologies are insufficient to digest the dreams of space enthusiastics, we may use some extraordinary propulsion systems or may-

be we may try to mimic the propulsion systems that the UFO's or Aliens have made when their craft is visible from Earth. Each of the galaxies are some million light years along with a distance of some another million light years between the two. But this kind space travel is not impossible. This is based on 2 facts,

FACT 1) We have enough evidence that there was a time when the aliens used to land on Earth and communicate with them. They are called Ancient Aliens. We have enough archaeological evidence of Ancient VIMANAS or Flying machines portrayed in different paintings and sculptures from the distant past. Through significant proceedings in this lane of study, we may find some viable information about them or how they visited earth? Why they visited Earth? From where they visited Earth? Many Ufologists, historians, archaeologists, anthropologists have claimed that there is enough evidence to dictate that there was a time in distant past where the earthmen learned several techniques and technology regarding medicine, architecture, weapons from the aliens. and if you think this stuff properly then you may notice the fact that after every consecutive 5000 years, there has been a boost in the technological advantages and the time period when these ancient paintings are done, the timeline matched. It is also quite obvious that, from the Maya, Sumerian, Java, Inca, Harappa, Mexican, Egyptian technologies, still now we humans got surprised that how did they achieve those architectural complex structures and how do they compute the astronomical calculations with so precise mathematics? We are astounded by seeing that this sophisticated accomplishment can only be achieved if they are guided by some ancient aliens or Prometheus who once visited the Earth. There are structures in the past which requires helicopter or a flying machine to monitor for the accuracy of measurement. As far as we can guess those ancient humans don't have flying machines but still they had managed to do this. How? There must be someone to guide them. If we can properly excavate the ancient ruins and structures, then there can be a chance that we might get jumped over to some serious conclusions beneficial to the mankind for the Space-Race. It can be further assumed that, in the distant far away past, when the pre-modern humans saw the aliens coming in fiery chariots or lighting machines descending from the sky with strange dresses and antennas on their head and very sophisticated tools beyond imagination, then there lies an obvious possibility that humans thought them to be gods and portrayed them in epics, ancient texts, rock carvings and scriptures.

FACT 2) Still now many UFO Sightings occurred and there are reasons for alien abductions. But it's not our job to decide whether they are true or not as most people said that these are false statements but according to the conspiracy theorists, some countries are there where the aliens have visited and information about them are kept classified. Different regions of Australia, United States of America, Istanbul, Phoenix (Arizona), Alien encounters have occurred and the neighboring people shows the strange pattern of flickering lights hovering around the sky after a regular intervals and strange sounds have been heard. UFO abduction is also not a case to be ignored although it lacks sound evidence. UFO-Sort of things needs to be taken seriously and if any country negotiated with the aliens regarding their technology then these should not be kept as government classifieds, this should be made accessible openly by humans all over the Earth as because without cooperation we can't succeed. Our civilization or more prominently, the humans or modern humans appeared to earth some 60,000 years ago and we have progressed tremendously and is still progressing as the day passes by. But its quite obvious that if there exists any civilizations in any of those exoplanets which lies in a habitable zone, then if they are some million years old – Then just make a simple comparison to 60,000 and Million that is 1,000,000 and decide that if humans in such short span of time progressed such a huge bit in technology then it is very much possible for the Aliens to atop our technology by some many orders of magnitude thereby making the humans-dream interstellar travel Possible. Maybe, in the faraway distant future, we might get close to them. But as of now, let the time decide what we should do and hopefully one day we can meet our ancestors in some distant perhaps millions of light years away, in some exoplanets of different galaxies which provides the womb of life to Earth.

Now, if we need to delve deeper into the mechanism of interstellar travel we need to study the rocket science and the various modes of propulsion attached with it. Besides a rocket propulsion there are many things that needs to be considered. Let's see this part by part for easier understanding as the rocket itself sounds very complicated. But in general, it's not, so let's find out,

Rocket Science comes in 7 parts whose scientific name is Space-Craft Systems Engineering.

1. **Payload**

Physics is a stupendously enchanting subject when it comes to rocket science. It is ambient and evolving. To elicit its importance one has to go deeper into the final stages of the rocket and that's the payload. It is composed of two fairing. Two on each side but not antipodal. A rocket scientist can only say or extrapolate the plausible jargon in deducing the profound orbital mechanics needed in respective corrections when the payload bursts it's fairing thereby engulfing the indoor unit or the payload into a continual mechanisms of orbital injection. The last stage of the rocket is usually placed into the orbit as it is only detached when the rocket enters the orbital parabolic trajectory. Therefore, the implacable faith of the satellite depends totally upon the orbital injection when and only it ejects its payload of satellite into the orbit. The firing while getting separated from the bifurcation of the last stage of rocket injects the satellite into a primary orbit. The rocket gets separated and faded away into the horizon of spatial oblivion. The injected momentum is so huge that the rocket gets a backward Koch while driving the spring module ejected during payload separation. The payload has small thrusters attached to it which encapsulates the final orbital trajectory of the spacecraft into the deep space with its periapsis remaining constant but the apogee continually engraving its position. The craft will be either a polar satellite or a fly by module which then escapes from the earth's sphere of influence and gets attached to the other planets motion by a law of vector addition which inhales the metastatic force of the target planet incubating the

force of the destined rocket. The gravity as becomes feeble so the craft can acquire a speed of about 2,000 Km/Sec on an average during interplanetary flight. The fly by module adjusts its optimal accuracy by means of trigonometric substitution thereby creating an angle of an accuracy of 1 degree Second with a spin stabilization for the receiving and transmitting of the ground-stationed wave through parabolic dishes. The fly by will enter the other planets gravity if it's only a fly by or else it may remain to circulate or orbiting the Earth thereby making inconsistent communication with the ground station located somewhere on the earth for its effective coherent amplitudinal frequency. The shape of earth is an oblate spheroid and so proper attitude dynamics is need to stabilize the craft as because a short margin of error will make the craft a re-entry into the atmosphere thereby causing a crash landing onto the earth's surface. The main victim of the craft is the donut shaped Van Allen radiation belts in the magnetosphere and the 21 kilometer bulge at the equatorial envelope. The fly by on the other hand will make gravity assist (a phenomenon in rocket science) and will reveal the deposit mystery of the cosmos by the interstellar probing action.

As we have seen that the payload splits away into two parts called the fairing into space which carries the satellite or humans into the cosmos. It comprises the 30% of the mass of the Rocket. Two distinct features regulated with the payload are the,
I. Centre of Mass.
II. Centre of Pressure.

Centre of Pressure always remains ahead of the Centre of mass because of the stability achieved by the mass of a two-body problem.

2. Propulsion Systems

It has 4 types of Propulsion.

Ion Thruster Propulsion with electrically charged ions along with some inert gas like xenon or argon with a very high specific impulse but lower thrust impulse. There is another type of impulse called the pressure impulse which we will now get into.

Specific impulse is generated by the momentum of the propellant and measured in seconds.

Pressure impulse is that the pressure inside the rocket or space craft is 200 times more than the surrounding pressure. So, as pressure moves from high to low... The gradient wants the inside pressure to get equal with the ambient or surrounding pressure and hence produces a force. This force acts as the Newton's third law "The opposite reaction" helps the rocket to move upward.

Thrust impulse is the impulse produced by the thrusters from the convergent divergent bell shaped rockets nozzle by solid or liquid propellants as because the convergent-divergent in fluid dynamics makes the gases ejecting from the rocket achieve subsonic to supersonic speed and these gases along with fire helps to produce a specific impulse or a momentum which directs the rocket to move upward. The fuel used are mainly kerosene, hydrogen, Monomethyl Hydrazine, and in order to ignite fire an oxidizer is used which is generally liquid oxygen.

Solid Propulsion Systems.

It is used as a solid fuel with an oxidizer for ignition inside the combustion chamber of the rocket.

Liquid Propulsion Systems.

The fuel is liquid like Monomethyl Hydrazine or kerosene with an oxidizer for burning. Liquid Nitrogen in cryogenic state is also being used.
N_2O_2 + Oxidizer ----> H_2O + Heat

Cryogenic Propulsion Systems.

Cryogenic is a very important term used in modem rocketry. Well, the details of this quantum hydrodynamics can be traced back to the year 1930, when one German and one Indian Scientist tried to establish a different structure of atom altogether based on a research conducted 200 Years ago in 1730. Yes, Albert Einstein and Satyedranath Bose. The Bose-Einstein Condensate or the 5th State of matter. The matter concerned is Helium-4 isotope. It is a boson with zero spin obeying Bose-Einstein Statistics having 2 protons, 2 neutrons, 2 electrons. "0" or integer spin. Spin is a property of angular momentum which is $h/2\pi$. 360 ° makes a complete Spin of a subatomic particle. However, there is another isotope of Helium, Helium-3 which obeys Fermi-Dirac Statistics having half-integer spin, but Helium-3 can fuse with another Helium-3 to form a Helium-4 isotope. Helium-3 isotope has 2 neutrons, 1 protons, 2 electrons. Now comes the cryogenic concept?

What will happen at 0° Kelvin or 273.16° C or 459.99° F. Well, it's the lowest possible temperature ever attained on this universe and called as "ABSOLUTE ZERO". When temperatures are increasing, the gas molecules become loosely packed with a tremendous kinetic energy.

The opposite happens when the temperature is cooled. The gas molecules becomes so tightly packed that the atoms have got "0" kinetic energy thereby clumped together to form a "Super-Atom" called Bose-Einstein condensate.

It is crucial to understand the fluid dynamics of Helium-4 isotope. Cooled it to 0° Kelvin or near to it as absolute zero is quite impossible, the Helium will become a superfluid that will have a distinct property. The super cooled helium will behave as a solid with zero viscosity and zero kinetic energy. The friction becomes zero and inertia will take over. The outcome is amazing – A gas which turned to a liquidized solid when stirred, it will continue to whirl until eternity as there is no friction between the atoms inside it. In the liquid propellant used for rocket engines, this property is used to cool liquid nitrogen which in turn can be used as a rocket fuel and gives the rocket a higher specific impulse (measured in seconds as the momentum in opposite directions combined by Newton's 2nd and 3rd Law of motion) which helps the rocket to achieve a speed of 7.8 Km/Sec (Parabolic Trajectory) to 11.2 Km/Sec (Hyperbolic Trajectory) and thereby attaining the escape velocity to reach the outer space.

Hybrid Propulsion System.

It comprises of thrusters attached to satellite or strap-on's attached to rocket for providing additional force to break the potential wall of gravitational Pull of the Earth.

After discussing about the elements of Propulsion, it is necessary to give the readers an idea of a rocket engine. Rocket Engines are the easiest configured engines in mechatronics engineering technology. Even the engine configuration is so simple that compared to it... The engines of a Plane or even a car is very gruesome. So, a rocket engine consists of 4 parts,

I. The first Part

The Fuel Tank and Pump

There are two separate fuel tanks one for the propellant and one for the oxidizer. The oxidizer burns the propellant upon being ignored. A propellant is usually a kerosene or a much more stabilized one that is Monomethyl hydrazine (MMH) which is a volatile hydrazine chemical with the chemical formula $CH_3(NH)NH_2$. and oxidizer is liquid oxygen. Note that both the propellant and oxidizers are liquid. They are in two separate tanks and there is a pump which pumps the mixture of the two into a separate chamber for ignition. The pump maintains the pressure flow and make the flow ideal and whenever needed according to the needs thereby controlling the reactions.

II. The Second Part

The mixing Chamber and The combustion Chamber

Here in the mixing chamber the propellant and oxidizer is mixed and the mixing then goes through a pipe to the combustion chamber where they are ignited by a electric spark. If liquid nitrogen is used, then the typical formulae of the reaction is,
$N_2O_2 + 02 + ---> H_2O +$ Propulsion

H_2O produced gets evaporated by the amount of heat generated. This heat results in the thrust which is used to levitate the rocket upwards into space following Newton's Third law of motion.

III. The Third Part

The Nozzle

The rocket nozzle is very important in propulsion mechanics as because the nozzle can't be under expanded or over expanded as because the thrust vector will be then de-stable which will make the rocket turn its head and flies with an improper trajectory. The nozzle should be ideally expanded with a half angle divergence of 60° and half angle convergence of 15° which is needed for the fluid dynamics as because the heat flow will reach supersonic speed with a maximum thrust.

Rocket works on the principle of conservation of momentum and the thrust must be isentropic and adiabatic. The principle of the second law of thermodynamics hold as because the enthalpy in addition to the entropy must be conserved with a tradeoff for total kinetic energy of the thrust vector. The fuel when ignited and starts to burn then its volume gets increased and the pressure becomes 200 times more than the ambient pressure as because due to the pressure gradient the high pressure will tend to flow towards low pressure which will thereby produce a thrust impulse in the order of pressure impulse that will kick the rocket upwards. Bernoulli's Principle is very important in rocket dynamics and moreover there should be adequate space inside the nozzle so that the rocket can withstand the vibrations or the supersonic jerking and also the nozzle doesn't gets leaked out due to the increase of the interior pressure.

IV. The Fourth and The Final Part

The Cooling Pipes

Liquid hydrogen when cooled at about -253° C... Then they become cryogenic and thereby helps in cooling the surrounding impact zone. The nozzle is surrounded by a coiling of the cooling pipes through which liquid hydrogen runs and this helps the nozzle to keep cold and prevents it from melting as the temperature runs around 175° C - 250° C. Cooling pipe also is used in the maintaining of the heat of the overall rocket nozzle as it equates the cold with the propellant heat thereby causing the rocket to be good and steady during the flight time. The most important thing while making a rocket is the Nozzle as because it should be ideally expanded so that the thrust vector should be Vertical and spherical. Over expanded will spread the thrust and under expanded will shrink the thrust. Again according to fluid dynamics the nozzle should be converging first and then diverging which will make the thrust flow supersonic. Maximal thrust can be gained if half angle convergence is 60° and half angle divergence is 15°.

3. Staging

A rocket is divided into 4 stages each with a different propulsion system for a better performance and extra advantage to speed is an important impact. This is because, in order to attend the escape velocity that is 11.2 km/sec, the consecutive stages of the rocket must be shed off from the payload or the main part as this would make the rocket lighter and therefore easier to ascend upwards.

4. Attitude Control.

Satellites are always oscillating due to the changing gravitational effect of Earth from equator to poles as because the shape of the earth is an oblate spheroid with a 21 Km bulge at the equator. This provides extra pull. Moreover, the drag and lift forces of the atmosphere makes the orbit of the satellite unstable thereby causing the requirements of thrusters which are small rockets attached with the spacecraft to give the 1-Degree Second angle accuracy for targeting the satellite to a proper stabilized direction.

5. Insulation

To prevent the rocket from charged solar particles or debris the satellite is covered with a 25 layers of insulating material which acts as a protection to also temperatures of around -200-degree centigrade during night time to +140 degree centigrade during day time. Moreover, the satellite had its own lithium powered battery which gives the craft the power supply in absence of light during eclipses when the silicon powered solar plates are unable to provide power. Moreover, the satellite has parabolic dish for reception and transmission of signals from Earth and beyond along with On-Board-Data-Handling Systems which are small computers to improve the rockets performance.

6. Orbital Mechanics

This was first predicted by Sir. Isaac Newton in the form of Newton's Canon published in the "Systems of the world" in early 1700 Century AD. The speed of 7.8 Km/Sec is used for any object to circulate around the Earth. The speed of 11.2 Km/Sec is the escape velocity and beyond this there is a hyperbolic trajectory. There are two ways in which a satellite can gain speed. The Gravity Assist which absorbs the law of vector addition along with the Hohmann-Transfer which helps to transfer from one orbit to the other by changing perigee keeping the apogee constant.

7. Lander or Orbiter

A lander lands in a Planet after several orbital corrections by means of spring and separable airbags which helps to protect the lander while hitting the surface of any planet from destruction. It contains it's aero-dynamic brakes along with the parachute needed to check the speed. There are several scientific instruments attached with the lander for examining the surface soil and thereby gives a clue to the geology along with small Microbe-Aliens present in the planets soil.

An orbiter is a spacecraft used to orbit the planet in a special orbiter mechanics and examining the planet's atmosphere and structure by means of Infrascopy without touching the physical surface. Now a days, with immense use of sophisticated engineering tactics, a special type of habitable orbiter has been constructed in the low earth orbit and that is the International Space Station. International Space Station is an observatory Centre for astronomy from the space. It is situated at LEO or Low Earth Orbit at a distance of 325-345 kilometers from sea level of earth. It is not totally free from the Sphere of Influence (SOI) or the potential well of gravity of the Earth. That's why a small amount of atmospheric drag occurs into ISS, as a result of which small rocket boosters are often needed to fire up to make it stabilize in its orbit. It is mostly in a coasting phase that the engines are shut off and follows a normal elliptical trajectory in revolving the earth due to the space-time curvature. The ISS is governed by solar power photovoltaic effect plates. Orbital mechanics is very important in respect of ISS as it is in a low earth orbit. Mostly, the LEO is free from the influence of satellites and so the ISS is free to wander upon the arena of space. Sometimes orbital transfer is required to come in contact with the HST or the Hubble Space Telescope by means of orbit fusion. ISS

is the key observatory in space which has no hindrances from the chaotic weather conditions of the Earth's atmosphere. It is the artificial satellite. The largest one with a dozen crew inside it.

(*In astronautics or orbital mechanics the orbits can be changed from elliptical to circular and vice versa by a slight addition of velocity provided they are coplanar in the conic sections*)

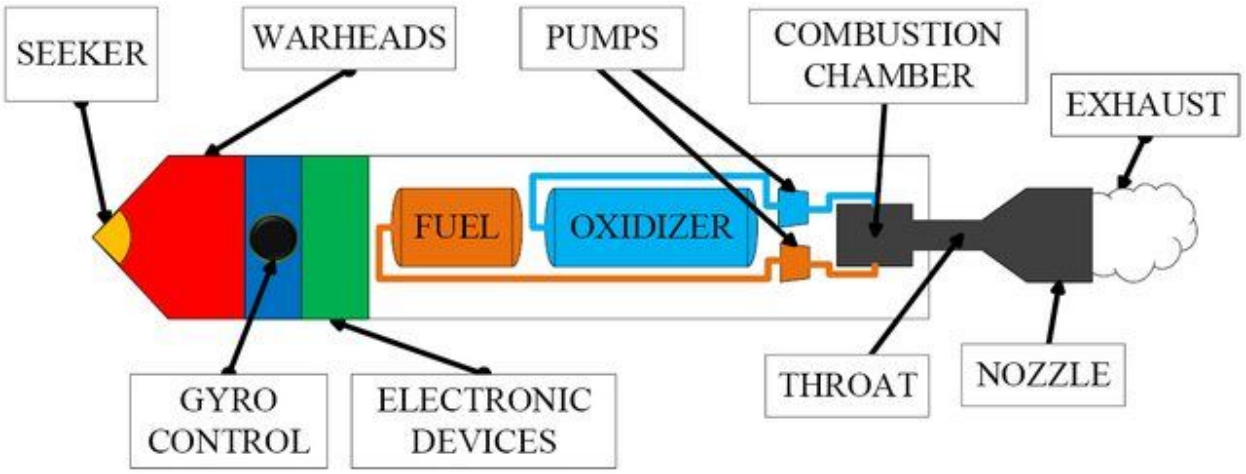

Figure 3: Different parts of a rocket engine. (*Courtesy: ÇAtalbaş, C., and Gulten, A. (2017). A Novel Approach for Optimization of Nozzle Angle and Thrust Vectoring Controller via a Sub-Mutation Genetic Algorithm. International Journal of Innovative Computing, Information and Control: IJICIC, 13(6), 1929–1940. https://doi.org/10.24507/ijicic.13.06.1929*)

AEROTHERMODYNAMICS/ATMOSPHERIC REENTRY AND HEATING

The biggest contribution which came into rocket science is the using of a Space-Shuttle as it is reusable and hence it can go to the orbit and move back to the earth many times which ultimately minimizes the cost. Indian space shuttle program is developing and it is taking time of upto 5 years with 600 engineers of ISRO to develop a prototype of the shuttle and tested it experimentally and successfully. The most challenging task of preparing a space shuttle is to consider its thermal calibration after an atmospheric reentry and that's the most difficult in the designing of a shuttle. A shuttle is just like an aeroplane but a modified and smaller one. It has its own oxygen for combustion as because it can't take oxygen from such higher altitudes like the normal aeroplanes as the atmosphere is relatively thin. It has wings but sharp shaped and not flexible like the aircraft as because it's wind has a very little function while compared to the normal aeroplane. A space shuttle is launched from Earth base by 2SRB and 1LRB or Solid Rocket boosters which gets separated earlier and falls into the Pacific Ocean and the liquid rocket boosters which gets separated at a relatively higher level into the Indian Ocean. After that the space shuttle continues in a parabolic trajectory and does the job of deploying satellites, carrying humans from the international space station or docking at ISS or maybe doing some orbit maneuver as and when needed for repairing some sorts of other floating space crafts. Now comes the crucial stage. It has to land on Earth and thus need to make an atmospheric reentry. First the smooth blue curve of the earth separating black space is viewed from the shuttle. Next is what viewed is an indigo colored sky. The spacecraft has to descend to the sea level at a very high speed in just 300 seconds. The acceleration is immense. It gets nearer to the escape velocity. The speed increases with an increase in acceleration. The huge speed along with the friction of the atmospheric air molecules causes the front part of the spacecraft to get heated upto 3000° C which is equivalent to burning a solid metal to liquid. The friction induces heat and the space shuttle in on fire. In addition, the speed traces to a maximum of 37 Mach that is 37 times the speed of the Sound which makes a turbulent shockwave that vibrates the spacecraft ferociously due to the increasing amount of pressure as the sound is actually a pressure wave. The shuttle slowly loses the altitude from 1,00,000 to 60,000 to 50,000 to 40,000..... The nose of the shuttle is covered with many silica tiles called as the heat shield which helps to protect the shroud of the spacecraft from getting burned away and fuses the heat to the other areas of the body. Now there comes a need for an aero braking system. The critical angle of attack of the wings are at 60° with a nose high position for an un-streamlined airflow which helps in stalling and reducing the airflow past the wings at a proper magnitude thereby causing the shuttle to lessen its velocity. This is done to check the current vibration of the shuttle in a direct contact with the Earths SOI or Sphere of influence as because the axis of the shuttle may get disturbed. After that the critical angle of attack is lowered to 15° for a gliding pathway the shuttle used to follow afterwards. After that the undercarriage is lowered and the space shuttle cuts the main engine off and glide through the atmosphere. The parachutes from the apt of the shuttle opens up and gives a backward push from the air passed across the shuttle which thereby reduces the speed to a great check. Ultimately the shuttle lands to the runaway at a high temperature onboard. The architecture of space shuttle or the orbiter is fairly a complex mechanism. It is an embedded rocket inside an aeroplane with an additional support of external fuel tank for orbital ascent.

Figure 4: Atmospheric Heating and Reentry. (*Courtesy: NASA*)

The shuttle has 5 Parts

[1] The front Fuselage
[2] The mid Fuselage
[3] The aft fuselage
[4] The external tank
[5] The solid rocket boosters

The space shuttle front fuselage is divided into front deck for the accommodation of the pilots (2) and along with this a GPC or general purpose computer which has been spread equally to all the sides of the front fuselage so that it can be accessed from everywhere in a redundant way. There are windows of thick glass outside the front fuselage for the thermal protection of reentry along with silica tiles. The deck is made of titanium and molybdenum alloy and this make it perfect to withstand the acoustic shock wave which is spread over the blind curved surface of the nose cone of the shuttle in an equally distributed manner.

For emergency exit there is an aft door through which the astronauts can come out using an emergency rope.

The mid deck provides the emergency material and also it contains flexible beds for the rest room of the crews. It also contains generator and pumps. It is a fully pressurized zone.

Now in between the front and mid deck there lies the airlock bucket for providing a channel into the mid fuselage which contains the robotic arm and the payload or the satellite. If EVA or Extra Vehicular Activity or Spacewalk is needed then there is a second hatch or the airlock door that gives the way to open payload bay or space where astronauts can space walk in an unpressurised condition.

The lower deck is used for odor/bacterial and waste management system.
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The mid fuselage is the most important part of the shuttle as it contains an airlock door which ultimately leads its way to the payload. The payload can be a satellite or other things like the utility materials for the crew of the international space station. There is one important thing in the payload bay and that is the robotic arm. The arm is just like a hand with hinges and joints and can be controlled from the front fuselage controlling panel. The arm usually attaches itself with the satellite that is at the payload bay by means of hook and then deploy them into space. It can also be used for repairing tasks.

The aft part contains three SSME or space shuttle main engine nozzles along with the flap wings along with two delta wings, a rudder and a parachute for the aerobraking mechanism while landing. The aft fuselage is very important as it is used for the direction maneuverability as well as the nose high and nose down with the left right motion by means of wings attached with it. It is quite similar to that of an aeroplane.

At first the fuel that is hydrogen and oxygen is ignited by means of a ignition spark. Then they passes through the turbo pumps for the increase in pressure and gets mixed with the oxidizer and ultimately to the combustion chamber. From there the fuel is directed outside through the converging diverging nozzle with a supersonic velocity as per the fluid dynamic and then after going to a certain height the two solid rocket thrusters got separated from the SSME. The SSME still provides the liquid fuel to the shuttle. At the time of the MECO or Main Engine Cut Off, the liquid booster got separated from the shuttle body by means of opening of the latches and there after the OMS or Orbit maneuver System burn is done to get the appropriate orbit. This burn is done more than one times for the reach of the particular orbit.

Once the shuttle reached the orbit it is ready for its orbital dance. It approaches towards the international space station with a slight velocity as because a large velocity will deflect its course of action and the exhaust plumes can be of a serious problem. The shuttle then starts to move round the earth with a speed of 7.8 Km/Sec. As both the ISS and the orbiter is moving at the same speed so, the orbiter gradually increases its speed to .1 Km/Sec and made a circular run around the ISS docking Port. The mid fuselage contains the hinge and the latches that fired open the payload bay doors into the space. The shuttle finally narrows the diameter around the ISS and then docked to the ISS. The docking part of the Shuttle is fairly complex and its called ANDROGYNOUS PERIPHERAL DOCKING and BERTHING MECHANISM. The international space station is a home for the astronauts for carrying out scientific experiments and they need to be mobile for the movement between the earth and the ISS. For this reason, the space shuttle is used and it is docked to the ISS via the docking port and then from there the astronauts can move freely between the space station and the shuttle in order to return to Earth.

The robotic arm of the shuttle then stars to regulate its duty by means of three joints, the shoulder joints, the elbow joints, the wrist joints along with 3 Degrees of rotation. The arm then grapples the Payload from the mid fuselage and maneuvered them to the ISS. After its successful completion the shuttle gets undocked from the ISS. It closes its bay door by putting the robotic arm manipulator inside and makes the atmospheric reentry.

This is the most crucial stage of the shuttle. It is now ready for the atmospheric reentry. The two rudders open up in both sides and the shuttle takes a nose high position. It slowly glides through the atmosphere. The silica tiles protect the shuttle from the heat of the reentry and the shuttles blunt face makes the heat distributed over its whole body. Finally while landing the temperature rises to 3000 degree centigrade and the shuttle is on fire. The temperature slowly cools down and the shuttle adjusts its flaps for a perfect pitch control and ultimately at the last part of the decent the parachutes opened up and the shuttle is on the runway for the ultimate return.

A MORE TECHNICAL NOTE FOR THE ADVANCED READERS:

At first the Igniter spark is used to lit up the space shuttle main propellants which are hydrogen and oxygen. They then passes through the turbo pumps low pressure to high pressure for the increase of pressure upto 400% Psi and then they get mixed with the oxidizer and then the flow gets spread in two ways. One flow is directed to the titanium pipes running surrounding the nozzle for cooling which when heated up comes back to the combustion chamber. The other flow is directed in to the combustion chamber directly where they burn with a high heat of 6000 degree Celsius until they get ejected from the space shuttle main engine nozzles. The nozzle is a converging-diverging nozzle for supporting the supersonic flow. The vibration shock is high and this sometime fractures the Nozzles, so, proper care should be taken to prevent any damage. The turbine pumps rotated at about 3600 RPM and therefore in the region of low pressure gradient the bubble forms which can be fatal to the propulsion chamber. The shuttle has a opening to the external tank by means of two latches through an umbilical vent. There are also 2 solid strap on rocket boosters to fire the ascent of the shuttle above 400 Kilometre into low earth orbit. Then slowly the fuel tank is closed by the vent and the latches gets compressed cutting the main engine from the shuttle belly. The liquid external tank along with two solid tanks are separated by making the space shuttle the way towards its orbit for maneuvering. Prior to launch of the shuttle the rocket or the external tank when gets ignited then there is a chance

of an acoustic vibration so water is spread into the launch base to minimize the shock and as the shuttle engine or the external tank contains a high amount of liquid hydrogen so frequent sparks are made from the surrounding to ignite any gases left over in the outside for burning out completely without effecting the shuttle main engines. Once the shuttle reached the orbit it still have some fuel in its main engines and feed line pipe and for this reason liquid Helium is passed through the pipeline to empty those channels from the liquid Hydrogen as because this can affect the shuttle by reaction with the atmospheric oxygen. Now the shuttle is ready for its orbital dance. It approaches towards the international space station with a slight velocity as because the nozzle ratio of the Exit area to the throat is 69:1... So, the thrust is over-expanded and this leads to a low pressure than the ambient pressure. But later as the shuttle reaches the orbit the low pressure usually diminishes and a high pressure occurs with a low ambient pressure. The shuttle then starts to move round the earth in an inclination of i |V| with a speed of 7.8 Km/Sec. As both the ISS and the orbiter is moving at the same speed so, the orbiter gradually increases its speed to .1 Km/Sec and made a circular run around the ISS docking Port. The mid fuselage contains the hinge and the latches that fired open the payload bay doors into the space. The shuttle finally narrows the diameter around the ISS and then docked to the ISS. The robotic arm of the shuttle then stars to regulate its duty by means of three joints, the shoulder joints, the elbow joints, the wrist joints along with 3 Degrees of rotation. The arm then grapples the payload from the mid fuselage and maneuvered them to the ISS. The arm is controlled by 2 crews... One from the Port Side and other from the Starboard Side with the help of a camera attached to the wrist of the arm for the view of the Payload Grapple Point Coverage. After its successful completion the shuttle gets undocked from the ISS. It closes it Bay door by putting the robotic arm manipulator inside and makes the atmospheric reentry. There is one very important thing to note about the space shuttle. The bay door containing the Payload can only open in an unpressurised condition of weightlessness. So, while in earth atmosphere, the top part of the bay door goes in and bottom part comes down. So, that ion tubes are mounted inside the bay door for the opposite effect, so that the door remains uninterrupted until it gets into the space. This is the most crucial stage of the Orbiter. The delta wings played an important part along with the flap and rudder. The speed of the shuttle increases to a hypersonic speed at the rate of 37 Mach # and then this shuttle will face an immense plasma of heat from the ambient atmosphere which is protected by the silicon tiles acting as the thermal protection system for the shuttle. The shuttle glides its way with nose high.... Finally after reaching 15,000 feet above the sea level the pilot makes the shuttle in a nose low for subsonic speeds. After some descent the shuttle again makes its nose high mode. Thermal insulation coating of silicon within aluminum honeycomb is there like a sandwich for protection of the heat on the forward part of the wing and the nose. The belly of the orbiter has no such coating as because it is not in direct contact with the reentry heat. This makes the shuttle giving it a maximum lift and thereby reducing the speed of the landing in the runway. The sonic boom develops and it spread over the blunt surface of the shuttle. The shuttle then opens up the 2 rudder in two different directions for a opposite Air Force thereby causing the aerobraking system active. The parachute opens up and the shuttle slows down its speed and then landed safely to earth.

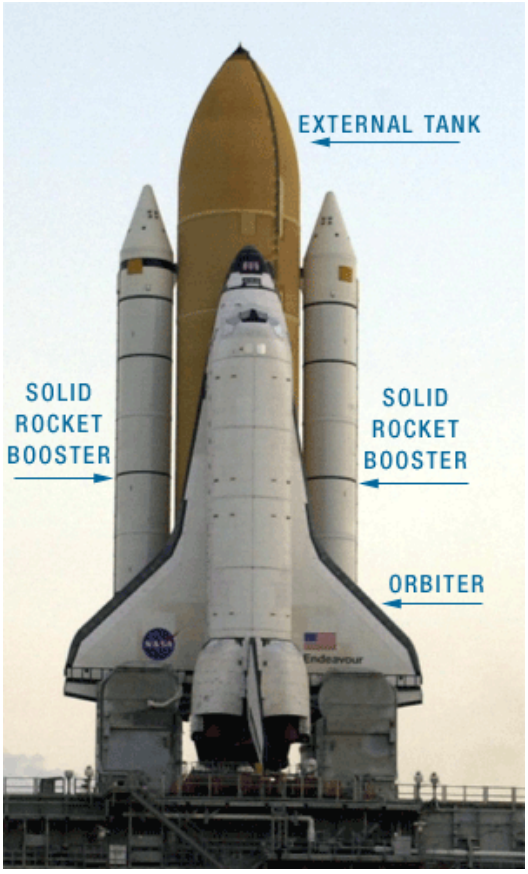

Figure 5: Different parts of a rocket carrying a shuttle. (*Courtesy: https://www.nasa.gov/returntoflight/system/system_STS_prt.htm*)

3 Dangerous faults can happen during the total procedure.

A. POGO - The vibration of the fuel with the RPM of the tank may damage the nozzle cone. So, precautions need to be taken.
B. CAVITATION - The pressure gradient formed when the fuel flows from the turbo pump in 4000 eps for an increase in pressure. So, in the low pressure area sometimes bubbles may form which leads to catastrophic incidents.
C. FUEL SLOSHING - The gravity of the rocket is estimated as the function of the acceleration over 2.5g-3g. If 3g is exceeded the shuttle will tear apart. So, as the gravity becomes lower in the upper part of the atmosphere, the liquid fuels tried to rise up due to weightlessness condition and this may reduce the fuel flow to the pre-burner for combustion. But due to the acceleration... Artificial gravity of 3G is produced which prevents this activity.

Now, we will explain a different types of Propulsion, Or basically the advanced propulsion. It is triggered by Sunlight. This mode of propulsion is a very crucial candidate for the future space-crafts. So, let's begin with this one,

What is the most dominant thing in our solar system? Everyone will say the Sun... But there is another thing which is the sun's chromosphere, the plasma envelope that surrounds the core of the Sun and emits the radiation. There are some regions on the chromosphere which are called as Sunspots or the Umbra Part of the chromosphere. This are the region where the inside temperature of the Sun's core are absorbed by the outside layer and makes a turbulent region over the Sun called as Sunspots. This region emits radiation. Tremendous radiation. The solar radiation. This is even accompanied by turbulent solar flares moving at a speed of 50 Km/Sec approx. and accompanied by ionic electron and proton. This solar radiation is hazardous to any spacecraft orbiting the Sun. The atmosphere of Sun has two parts... The first layer or the photosphere, The second layer or the corona. The temperature of the outside layer is sometimes cooler and so the solar radiation gets absorbed and thereby providing dark spectral lines known as Faunhoffer Lines of the Sun's atmosphere. The heliosphere is the region dominated by the Sun. The heliosphere extends far apart from the Earth's atmosphere and comes to an abrupt end in a region called heliopause. Our magnetosphere is the region dominated by earth's magnetic fields. The solar particles along with charged protons and electrons got attached to the magnetosphere and forms a donut shaped fiery region called Van Allen Radiation belts. This is a tremendous hazard to any orbiting spacecraft. Moreover, the ionosphere is also affected by the Sun's atmosphere. There is a region of hydrostatic equilibrium which according to fluid dynamics is a region where the fluid (in this case air) flow remains constant. The ground station which transmits radio signals to the satellite orbiting above the ionosphere or 1000 Km above the Earth's sea level for reflected back by a phenomena known as Faraday rotation which is the interruption of the linearly polarized radio waves interacting with a magnetic field and thereby forces to return back to the earth without reaching the satellite. This is a threat to communication systems. The temperature is slowly decreasing above the earth's surface upto stratosphere where the temperature is roughly -57 degree Celsius. But the temperature increases to 600-800 degree Celsius in the ionosphere which is very warm. The atmospheric pressure declines rapidly as a result of the thin gravitational pull from the Earth's sea level.

So, Sun is a threat to the Spacecraft mechanisms but there are one alternative sources available. The effect of solar radiation imparts a momentum or pressure on the thin fabric and the pressure becomes more as the fabric becomes thinner and thinner measured in per cubic centimeter of the area in terms of Pascal. The radiation pressure is almost nil in the Earth's low atmosphere but the pressure dominates from the ionosphere. In the region of magnetosphere to the region of heliosphere the pressure of solar radiation increases exponentially and even there is a region at the outer boundary of the heliosphere which is called the heliopause where the solar radiation got a higher intensity of several hundred Pascal's along with a high speed of 100 Km/Sec called the magnetosphere. This is also a region which marked the region of bow shock that is the solar winds get supersonic or the Mach # is > 1. This bow shock is a region dominated by a high pressure with a higher density and this may provide a hazardous effect to any object getting near to it.

But the impulse of momentum is extremely useful to a particular type of spacecraft which is made by a thin parabolic dish of fabric with a very less thickness of 3-4 microns and thereby makes the highest exposure to the solar winds. The winds in turn creates a high pressure or imparts a high momentum on the parabolic dish fabric which will provide a potential source of power to the spacecraft which is driven by solar radiation pressure. The more it comes closer to a star or sun, the more will be the solar radiation pressure on its dish and the more power it can generate from the impart of the solar radiation linear momentum. But this sort of a spacecraft is very difficult to be made as because to provide power to the craft the parabolic dish must have to be large in length and thereby is very difficult to accommodate in the payload of the rocket prior to launching it in the orbit as because the more the dish area, the more the radiation exposure, the more the power of the spacecraft.

Well, this type of spacecraft may prove useful to the future generations which can only fly by means of the linear momentum of the solar radiation without any liquid hydrogen, oxygen, nitrogen, kerosene and Momomethyl Hydrazine as a fuel. Well, photon propulsion can be a possible candidate for the extraterrestrials. As because it doesn't need any physical fuel either liquid and solid moreover as the craft passes close to a star its velocity will be increased by the impact of the solar radiation and also this velocity in the hard vacuum of the space will result in a tremendous speed which may be possible for the UFO kind of propulsion.

DETAILS ON DOCKING MECHANISM

The international space station is a home for the astronauts for carrying out scientific experiments and they need to be mobile for the movement between the Earth and the ISS. For this reason the space shuttle is used and it is docked to the ISS via the docking port and then from there the astronauts can move freely between the space station and the shuttle in order to return to Earth.

The Rocket which lifts the shuttle consists of 1 Main Liquid Tank, 2 Solid Rocket Boosters along with the orbiter or the shuttle itself. During ascent of the first mode... The rocket rolls along its longitudinal or X axis for a Pitch correction in its lateral or Y axis. The Pitch correction is needed in order to alleviate the weight of the rocket along with the shuttle in a lower magnitude. The Elevons are deflected for the load free in the Pitch correction axis. Along with the roll axis rotates the rocket and directs its thrust vector in such a way that the Nose of the rocket is in a nose high position with a -4° angle of attack with the X axis along with a 0° angle of attack with the Pitch axis. Now after the first stage ascent the solid strap-on boosters are jettisoned but only that can happen if the pressure of the boosters is less than 50 Psi. If the boosters are jettisoned at a higher velocity then the Yaw or the Z (transverse) axis will rotate the thrust vector and the shuttle will be out of control. The throttling of the engine is at 100% but when the Max-Q is reached then the dynamic pressure of the rocket is so high due to the relative wind gusting in opposite direction that the throttling is reduced to 65-78% to minimize Max-Q. Now it's time for the engine to be jettisoned from the External Tank. Now after jettisoned the rocket begins with a nominal horizontal trajectory with almost a straight line in the same plane as that of the target axis. The Roll axis of the shuttle is positioned to a azimuth direction for the correct orbital inclination with respect to a target vector in order to track the target position properly.

The second stage ascent occurs after MECO or the Main Engine Cut Off. In this case the liquid external tank is jettisoned with an angle of not less than 48° angle of attack so that no torque is produced in the shuttle and it can stall in this high angle of attack and reduce the aerodynamic drag. Soon after the external tank is jettisoned the shuttle closes the latches of the turbo pump and dump the excessive hydrogen and oxygen from the feed lines into the space with the help of liquid helium to prevent any explosion with the interaction of atmospheric oxygen. The sonic boom occurs with a splash of water from the cloud around the rocket. The boom cone was still there after a certain time.... The rocket then follows a spiral trajectory until it starts its main engines into power for the orbital maneuver.

Now, after MECO, the main duty of the shuttle is to get into a proper orbit. For this it performs a OMS 1 burn in order to get into a circular orbit. Then it will perform a OMS 2 (Orbital Maneuver System) burn in order to get into a highly circular orbit. Now, as the shuttle is in a position to achieve its target in a proper interception, the shuttle required its GPC (General Purpose Computer) to make a target Coordinate interception. Now, the main duty is the PROPER GNC (Guidance Navigation and Control) to be perfectly aligned in respect of the target for docking. Here the target is the ISS. The shuttle first compute its omicron angle that is the intersection of all the Yaw, Pitch and Roll axis along with their rotation with respect to the target vector. In this case the phase angle is computed first, that is the coordinate of the shuttle along with the projection of the shuttles coordinates into the targets orbital plane. This phase angle once contributed, the vectors of the shuttle and the target are summed up to get a relative position with respect to Sun. Solar illumination is necessary in the background of the stars in the dark because, the only way the shuttle can see its target is due to the reflection of the sunlight from the target or ISS with respect to sun. So, the first coelliptic burn should be initiated after the sunset as the target will be gradually visible at the sunrise. Proper timing of the burn or launch window is necessary as because of the shuttle can't trace its target in the proper time then the whole process will be terminated as there will be no reflection of the target from the Sun. Coelliptic is a special type of ellipse with 2 semi-axis together. The shuttle is in a different altitude than the target. The target is in the up and the shuttle is in the down. So, the shuttle is moving at a relative high velocity than the target. The shuttle is now performing its height adjustment maneuver for reaching the height of the same coplaner plane. It then burned its second coelliptic burn to get in front of the target. Now, the shuttle is in a station keeping point that is just behind the target but some thousand feet below. Now, the shuttle will make the Terminal Phase Injection in order to get nearer to the target vector. Here from, the shuttle will rotate the ISS at a diameter of 200 kilometre. Remember one thing, both the shuttle and the target are in a same velocity that is 7.8Km/Sec and for this.... The shuttle needed to burn its RCS Jets or Reaction Control Systems Jets in order to a increment of 0.1 Km/Sec velocity. Ti or Target Intercept begins from T-100 to T-0..... Then the shuttle will move closer to the ANDROGYNOUS PERIPHERAL DOCKING SYSTEM. Now, as the shuttle is needed to be stabilized so from both the +/- X direction it will fire the RCS jets but due to this there provides a spontaneous reaction in the Upward position in negative or -Z axis. This will result in the aerobraking in a minimal magnitude. The shuttle must not fire its upward RCS jets as because this will increase the Plum impingement with a warm air that may affect the solar panels of the ISS. So, the shuttle will now be in a stable position and is ready to dock with the ISS.

The docking system has two parts... The ISS docking post is Passive with a docking ring, 12 hooks and latches. The active docking part is the external airlock of the shuttle with a camera and hook engagement ring. The shuttle will engage itself with the docking port but is now in an unstable equilibrium due too the difference in the centre of gravity of the shuttle and the space station. So, the shuttle will continue in a pendulum trajectory but to much oscillation may affect the station or the target if the shuttle crushed in it. Now, as the relative velocity is quite different to the ISS and the shuttle, the pendulum swing will occur for half an hour and then it will gradually stops and the misalignment is automatically adjusted by the shuttle crew with the help of a camera mounted on the shuttle airlock docking port. The hook will engage and the latches will tighten and the shuttle finally docks with the International Space Station (ISS).

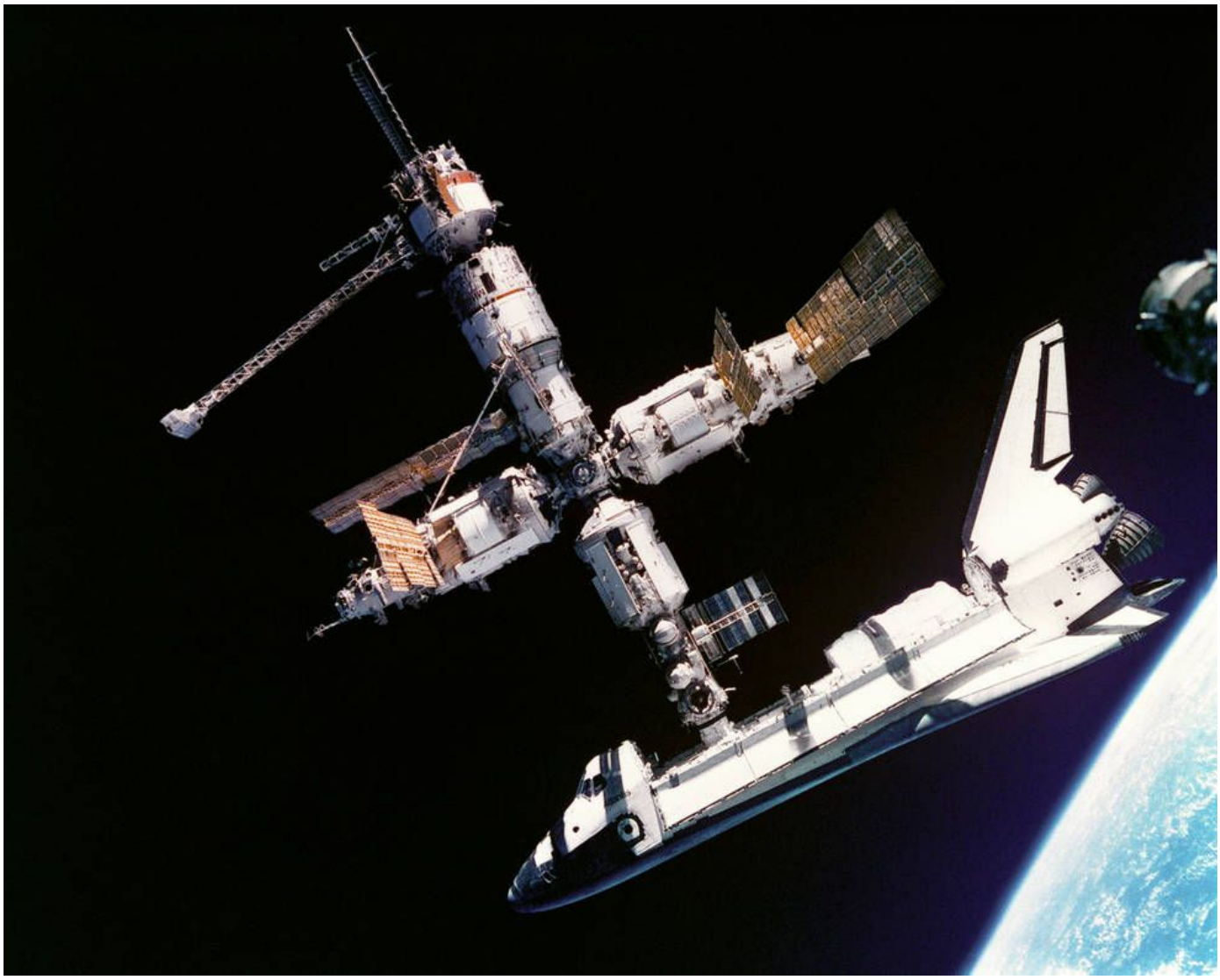

Figure 6: Space shuttle Atlantis docked with MIR space station. (*Courtesy: https://www.nasa.gov/atlantis-meets-mir*)

ABORT MODE OF SPACE SHUTTLE

Landing is an important part when it comes to a orbiter. Because it has the undercarriage which is steerable for a safe landing in a runway although it comes with a high velocity from space. So, to make the shuttle program effective... Every GPC (General Purpose Computer), GNC (Guidance, Navigation and Control) along with BSS (Backup system software) with 3 SSME (Space shuttle main engines) including the High Pressure Oxygen and Hydrogen Turbo Pump needs to be properly functional. The wings have less aerodynamic stress in average as the orbiter stays a limited time to the lower atmosphere during reentry but during that short time it has to take a heavy stress due to aerodynamic lift and drag. So, if any of the above procedures go wrong, then initially manual operation is switched on from DAP (Digital Auto Pilot) Mode and if this also proved ineffective then the mission needs to be aborted for the sake of both the crew and the shuttle. There are 4 Abort Modes discussed below:

RTLS - Return to the landing site which is the dangerous abort mode ever accomplished by a shuttle as this requires the abort mode if the main engines are corrupted and the shuttle can no longer throttle. After T+2 mins. The SRB (Solid Rocket Boosters) are separated. The ET (external tank) is still attached with the shuttle. The shuttle with the help of the external tank makes a 360 Degree rotation with the help of the thrust vector by adjusting the shuttle nozzle and pitch down by adjusting the elevons of the shuttle tail. Then after T+9 mins. The shuttle will jettisoned its external Tank in a nose low mode to prevent crashing of the shuttle with the ET and firing of RCT JETS for acceleration and will land on the place nearer to the launching site. *TAL* - Transoceanic Abort Landing. This abort mode is applied when the shuttle is unable to compute its mechanisms due to its interior fault. In this case the shuttle rising from the Kennedy Space Centre in US will land in some runway in Europe or Africa after T+30 mins. From lift off. *AOA* - Abort Once Around. This technique is applied when the shuttle is in a loss of its Orbital mechanisms like a defect

in OMS (orbital maneuver Systems) or RCS JETS (Reaction Control System jets). In this case the shuttle takes T+90 mins. To reach the landing site by a complete 360 degree turn around the globe but still the shuttle needs to Propel its OMS (Either one of the two which is active) to Made a trajectory correction as the Earth has rotated 1,100 miles in that time. *ATO* - Abort To Orbit. This mode is applied after OMS 1 burn to reach a circular orbit. Then OMS 2 burn to reach a higher circular orbit. But when the shuttle can't reach its desired orbit due to lack of propellant then the shuttle is commanded to land on the earth by making a pitch correction with the trailing end front thereby making a de-orbit with 300 fps and then gliding through the atmosphere at about 1500 fps with a nose high mode for stalling. It has mainly two uses: To increase the drag and to increase the lift by raining a nose high angle of attack at about 40 degree from the flight path and then lands to the runaway with the opening of the both rudder on the opposite sides along with the aerobraking parachute from the aft fuselage. But if the shuttle continues its mission properly then there is no need for any contingency abort and it will land in the same way as ATO Abort but from a higher altitude.

Figure 7: Canadian Robotic arm of Space Shuttle. (*Courtesy: https://www.cnet.com/pictures/canadarm-the-zero-gravity-grappler-pictures/2/*)

INCAPABILITY OF THE CONVENTIONAL ROCKET SCIENCE

In this 10^{12} galaxies with each galaxies holding approx 10,000 to 40,000 exoplanetary solar systems in a certain patch and the evidence of the ancient paintings and sculptures with the pictures of Spaceships and various UFO sightings, it is very clear that UFO's are visiting Earth. But from where in this 96 billion diameter observable universe. We have no answer and what we have achieved is the Voyager 1 and 2 crossing the solar system and robotic mission in Mars and Human mission in Moon.

Peoples are excited about Falcon Heavy, Starship and other things but it's time to consider the real incapabilities of Eartians in Interstellar Travel.

Points of incapabilities:
1. A rocket burns an excessive amount of fuel in a few minutes (both solid and liquid propellant) and ion thrusters in space.

2. A rocket usually have a speed very very less than that of light, not even some fractions to consider.
3. The ISRO's GSLV MK-3 weights around 200 adult elephants. Now imagine the weight of SpaceX Falcon Heavy and starships.
4. Rockets are incapable of using warped spacetime to travel a large distances.
5. All rockets have a huge surface area and massive containing 60 to 80% fuels.
6. Humans in the rocket can't survive for long enough due to high induced accelerations and long journey periods because it's impossible for the humans to hibernate as shown in Interstellar movie.

What needs to be done:
1. Using the ambient gravity to create a repulsive force that would accelerate the spaceships at a speed even greater than that of light without using any conventional fuel.
2. The weight and size of rocket reduces to 90% because fuel is not necessary to utilize the ambient gravity as force fields.
3. Lighter spaceships makes high acceleration and research should be started on etheronic medium to cultivate proper ways of travelling through vibrations of the superluminiferous ether rather than through normal space-time.
4. Reduce the surface area of Rockets and make it look like a disk as because the warped passages makes the disk to rotate preserving its symmetry thereby conserved energy according to Noethers Theorem.
5. If rocket uses warped space-time, or warp drive, or superluminal speeds in etheronic mediums, then humans won't have to stay for thousands of years inside a spaceship to go for a distance of Mega Parsec (1 Pc = 3.28 Light Years).
6. Scientists should concentrate on the researchers of Thomas Townsend Brown, Biefield, Hutchison, Nicola Tesla, Eugine Podkletov, Prof. John Searl.
7. People lives for approx 80 years in average and in warped space-time time being constant, age doesn't matters.
8. MICHAELSON-MORNLEY experiment should be revised and redone and reinterpreted to consider the etheronic effect and the medium of propagation of Zero-Point Energy in space-time.

Today's rocket science if continued in the way it is, it won't go any further than Mars.

Interesting Facts

#1 International space station revolves around the earth 7 times a day approx. But what if ISS also rotates, because if we need to settle any advanced civilization in space we must need gravity and according to the principle of equivalence of general theory of relativity it can be said that a rotating body produces a centrifugal force and that tangential velocity along the circumference of the rotating object is the cause of generating an inward force to balance this. As a result gravity emerged. So, if international space station may rotate with a certain RPM then it should have an induced gravity due to centrifugal acceleration.

#2 Intercontinental Ballistic Missiles are the modified rocket except with a nuclear payload. The basic equations governing the principle of missiles are,

$$\Gamma = \theta + \psi + \Omega$$

Gamma = Theta + Psi + Omega

Derivation,

$$\Gamma = \theta + \psi/2 + \psi/2 + \Omega$$

This is the equation of a Intercontinental Ballistic Missile. The mechanics are same as that of a rocket engine but there is a nuclear weapon attached to its nose or payload. The missile when fires from Earth leaves the Earth's atmosphere by a certain angle called "Theta (θ) and then rises above at a certain altitude of 100 kilometre which is represented by Psi/2 (ψ/2) which then reaches the burnout stage that is the end of the fuel. Now after that the missile takes a parabolic shape of a projectile trajectory of 45 degree and makes a downward angle of the same as before Psi/2 (ψ/2) and then makes a re-entry into the Earth's atmosphere and manages an angle of Omega (Ω) before hitting its target.

A missile with a 100 kilometre burnout stage can achieve a maximum trajectory of 8000 kilometer which can cause the impact by hitting the ground. The missile must be accurate to .1 degree of accuracy or else its impact region will vary with a 10 kilometer radius from the desired location.

#3 Warp drive is travelling faster than light without time dilation and Lorentz contraction!!! Imagine that a spaceship is covered by a bubble of exotic matter like negative energy to maintain a 1g Earth acceleration without harming the astronaut. Now let's see the diagram.

$$X---O-----------------------------Y$$

The spaceship is at O with a destination at Y. (---) is the Spacetime between source and destination. Now if the Spacetime between X and O gets expanded then the Spacetime between O and Y is contracted. So, the spaceship between X and Y at O will move closer to Y away from X. Like:

$$X-----------------------------O----Y$$

The Point (O) moves forward without any propulsion but only due to the expansion and contraction of Space-time. This is warp drive. The Alcubierre drive. Superluminal speed is achieved without the effects of Special Relativity. So, the ultimate thing becomes:

$$X------------------------------------OY$$

That's the magic of Physics of the warp drive.

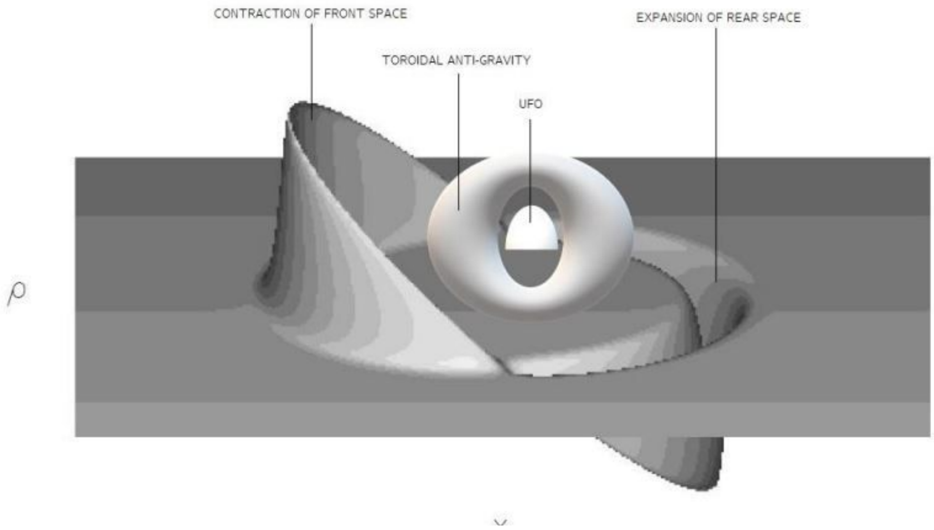

Figure 8: Alcubierre Warp Drive is seen with the spacecraft being emerged inside a gravity bubble. More explanations have been provided on Beyond The Rocket Propulsion – Secrets Of Electrohydrodynamics. The space-craft being embedded inside a Horn-Torus bubble of Anti-Gravity experiences 1g Earth Gravity and eliminating the requirement of Exotic matter. The Horn-Torus having 2 radius, R – the big radius, r – the small radius, when the surface area becomes $2\pi R \times 2\pi r$ then in this configuration of the ionic gravity shield $R \approx r$ making a high tidal zone. (Described in the last sections)

#4 Effective launch by minimizing propellant – As Sriharikota in Andhra Pradesh is at the Southern Part of India - The Vikram Sarabhai Space Research centre is effective in launching rocket as it is nearer to the equator. The shape of the earth is an oblate spheroid with a 21 Km bulge at the equator. With the same thrust – At least 8 tons of more payload the rocket can afford while launching. The mean mass of the earth is greater than the Oblate mass of the equator as seen from the spacecraft. So, the rocket will gain its speed. Moreover the burnt out stages can easily fall on the Bay of Bengal instead of the ground. And apart from all these, the most advantage is that, the trajectory of the rocket is maneuvered from Straight to East as because in doing so, the rocket can get its relativistic velocity addition by the rotation from earth in west to east.

#5 In Indian epic Ramayana and Mahabharata which is scripted in around 1,500 BC, 3,500 Years ago – Vimana were mentioned in the Script. Alexander while invading India against Porus King in the battle of Hydespeas stated that uncontrolled object or missiles are attacked towards them from the Sky. In Ramayana, Ravana captured Sita and fly to Sri-Lanka by means of a Vimana. In the Ajanta-Illora Cave Paintings several sculptures have been seen similar to modern aeroplane and modern Pilot. One of the Scientists in the Emperor Ashoka's Council wrote a book about the "Secrets of Anti-Gravity"... But the book has never been found till now. But what are those Vimanas? and how ancient Indians acquire the Knowledge of Flying machine. There were namely 4 Types of Vimans – Shakuna Vimana. It had wings that helps it to fly. Sundara Vimana. It's secrets are unknown. Rukmi Vimana. Governed by Mercury Vortex Propulsion Systems and is two floored. Tripura Vimana. It has three floors and is capable of going on sky as well as under water. They were controlled by the power of mind. But how can these by achieved is still yet a mystery. The propulsion system is composed of several gyroscopes attached spirally in an electrified mercury vortex. NASA has prepared a classified Aerospace Project and build a triangular shaped craft governed by mercury vortex propulsion Systems called TR-3B. They surprised to see that almost 90% weight reduction occurs into that craft by means of anti-gravity effect and it can levitate up to a height of a 50 Stored Building. I have been researching about classified aerospace projects and found out that the Egyptian texts also quoted about these Ancient Flying machines even before India at roughly 4000 BC, 6000 years from now. Does the ancient engineer really knew the effects of levitation and Anti-Gravity propulsion?

#6 INDIA's Fat Boy GSLV MK 3 rises in glory with a total weight of 690 Tons similar to the weight of 200 full grown elephant. It places satellite on geostationary orbit above 36,000 Km from the sea level. This is important because to cover the whole earth above the elevation of 10° altitude, 3 Geostationary satellites of 120° coverage each is needed for a total earth degree of 360. These satellites rotate with the same speed as that of earth thereby appears stationery due to inertia and communicate telemetry from the satellite-ground-satellite via parabolic dishes fixed to a certain point. Complexity of ground station is minimized to a great extent.

IV. Kessler Syndrome: Is our space safe for satellites?

LEO (Low Earth Orbit), the orbits nearest to the Earth at less than 2,000 Km orbital altitude, is full of space debris, space junk and space garbage. These junks come from defunct human made objects in space like the ejected payload fairing, the upper stage separation of rockets, solidified liquids which are ejected from spacecrafts, old and non-functional satellites, erosion, and collision, paint flecks, the fuels from spacecrafts which expanded due to low gravity and defrag the combustion chambers, un-burnt particles from solid rocket propellants, anti-satellite missiles which destroys satellites producing thousands of smaller fragments poses rick to spacecraft, satellites, solar panels, star tracker, scopes of numerous artificial satellites orbiting the Earth. The mass asymmetry of Earth with a bulge in equator causes an uneven orbital periods of debris dragging them down, moreover, from the High Earth Orbits, those objects have been dragged down to the LEO causing LEO densely populated with an increase in the amount of potential risks to orbiting functional satellites. As per the data of Oct. 2019, more than 20,000 artificial objects are there orbiting Earth including 1,419 operational satellites. As of Jan. 2019, there have been an estimation of debris as small as 1 cm are there about 128 million pieces with 9,00,000 from 1 to 10 cm and debris above 10 cm are counted as 34,000. The space debris, from higher orbits have been dragged into lower orbits by gravitational perturbations, lunar perturbations, solar wind, solar radiation pressure and this results in a high density of objects in the LEO Plane, which increases the chance of head to head collisions at a speed of twice the orbital speed, theorized above or equal to 16 Km/Sec with space, being a hard vacuum results in tremendous impact and could possibly harm the operational satellites including de-orbit them. Sometimes the MMOD (Micro-meteoroid and Orbital Debris) posed such a serious hazards to spacecraft that they could not be even protected by the ballistic shields.

The Kessler Syndrome propped by NASA Scientist Donald J. Kessler in 1978, is a theoretical scenario, in which the high density of objects in LEO becomes so large that, collisions started to occur between objects and this cascade of collisions gives a chain reaction, that further, increases the chance of collisions. If these collisions starts to happen then, this could pose an eminent threat to the use for satellites for many generations. and, also, the critical density has almost been reached in LEO as regards to space debris. According to the "National Academy of Sciences" a 1-Kg object travelling at 10 Km/Sec is capable in breaking up a 1000 Kg Spacecraft on a head to head collisions giving rise to numerous 1-Kg debris that results in space junks. The analysis of Kessler divided the problem into 3-categories as such,

1. If the density is lower than the critical density, then, the impact is slower than their decay rate and the problem is not significant.
2. Beyond this critical density the impact of collisions is comparatively larger.
3. Even beyond this, the critical mass production exceeds decay leading to a chain reacting which becomes hazardous to space orbiting satellites and will reduce the populations of debris, being lost in collisions. This can also create a large spray of small debris which may accumulate to form a plasma wind and hampers the solar panels of the orbiting satellites which are not protected by ballistic shields.

To avoid these issues and to make space safe for explorations, the space industries engaged in active space operational launch activities, can use a controlled atmospheric reentry system, boosting to graveyard orbit or shift the craft from MEO (Medium Earth Orbit) to an unstable resonating orbit with the Sun or Moon, which speeds up the orbital decay. For the debris, ranging from 1 to 10 cm, a multi-megawatt laser-band called as 'laser broom' could hit the debris by laser, ablates it, changes the eccentricity of the orbital plane until it re-enters the earth atmosphere harmlessly. Ultimately, its on the hands of humans to develop technologies for destroying debris to smaller particles and to being them back inside the atmosphere, which would ultimately burn away by atmospheric re-entry heating and makes the space suitable for exploration and satellites around the Earth.

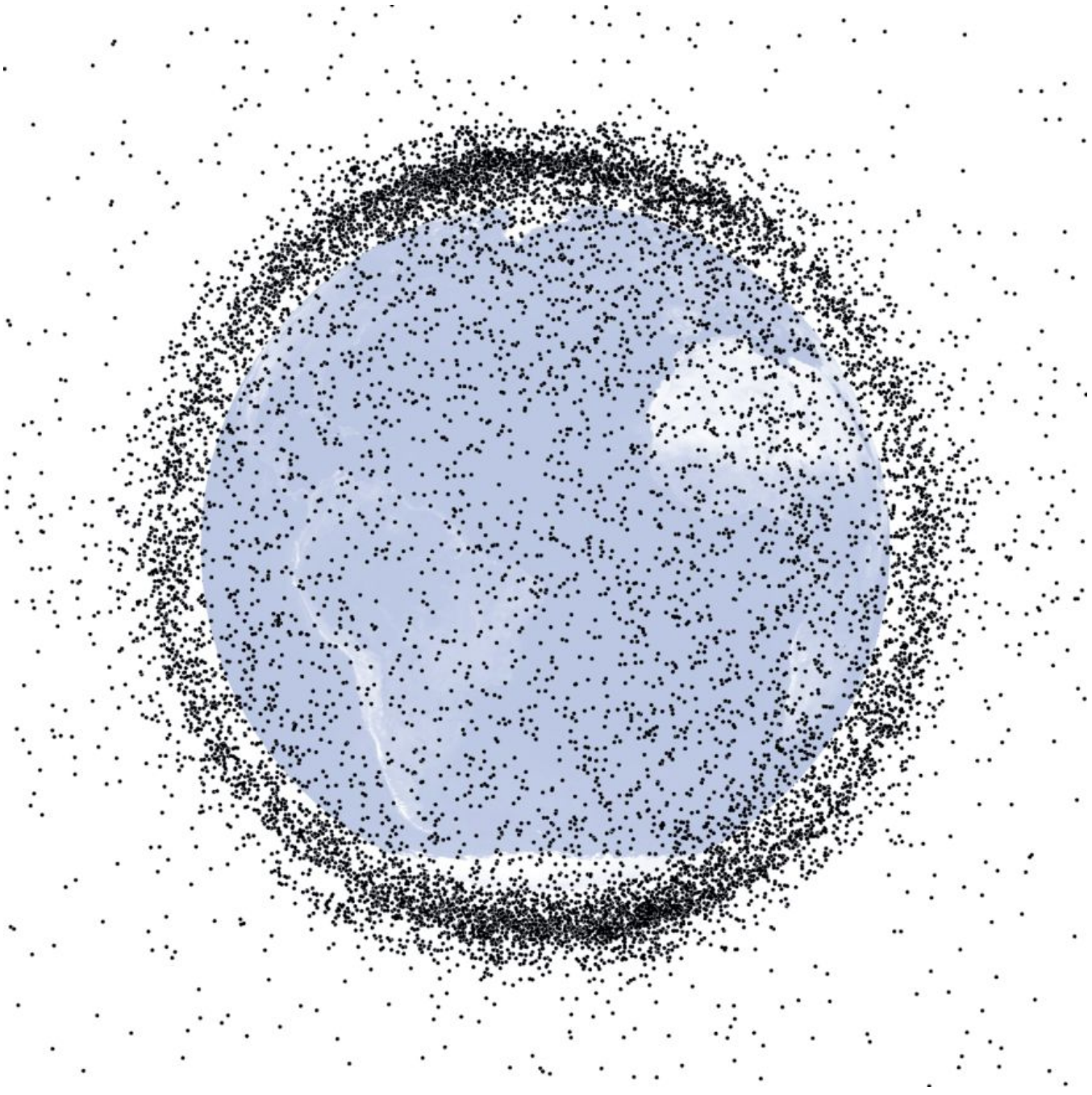

Figure 9: Indicating the amount of space junks or debris orbiting Earth in various orbits (*Picture Courtesy: NASA Earth Observatory, Author: Orbital Debris Program Office, License: Public Domain*)

V. Orbital Mechanics

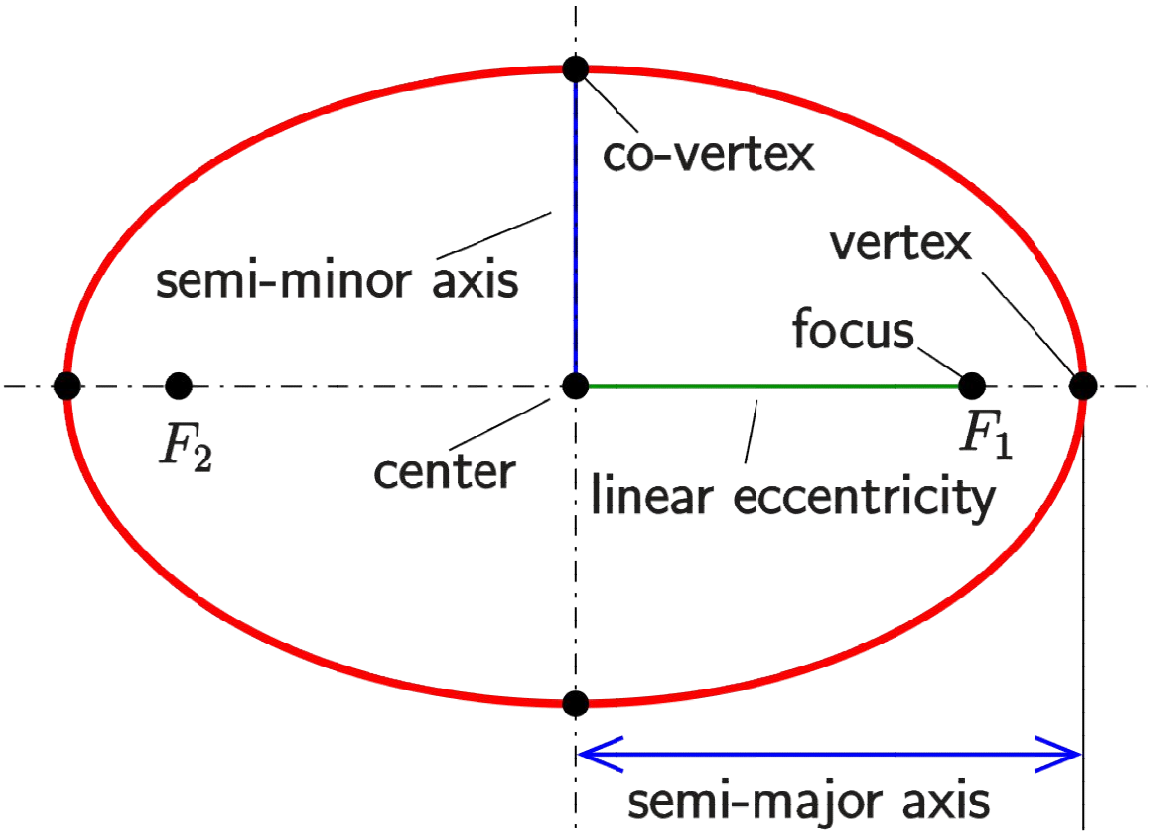

Figure 10: Ellipse with all its labeling F1 and F2 are focus. (*Courtesy: Ag2gaeh, Own Work, Wikipedia, CC-BY-SA 4.0*)

An orbit is elliptical except in some cases where they are circular. Ellipse is a conic section which has several parts, 1. Periapsis - The closest point from major focus. 2. Apoapsis - The farthest point of major focus. 3. Major Focus - The Right hand focus of the ellipse. 4. Minor Focus - The left hand focus of the ellipse. 5. Semi-Major Focus - Half of major focus. 6. Semi-Minor Focus - Half of minor focus.7. Semilatel Rectum - The distance from the major focus to the ellipse itself. Everything is important in orbit mechanics and the term is familiar to the rocket scientists who deals with the orbital maneuver. It is the Rocket which generally places a spaceship or space shuttle to the LOW EARTH ORBIT which is 250 kilometre from the sea level. Then a small amount of velocity is added like 1.8 Km/Sec to move the shuttle into the Geostationary Transfer orbit for moving out into the final circular orbit. Now again a small amount of velocity is added like 0.7 Km/Sec to move it to the final orbit where it can deploy the satellites at about 500 Km from the sea level. This orbital transfer is called Hohmann Transfer. Now, according to the triangle law of vector addition, a spacecraft while in acceleration phase if passes round a planet in a parabolic trajectory around a planet then it will pick up the speeds of the planet and hence its speed will increase. The relative speed of the planets revolution is picked up or gets added to the spacecraft which gives it a kick. Such mechanism is called Gravity Assist and this increases the speeds of the interstellar flight. Now, sometimes International Space Station which is at 51 Degree inclination to Earth needs to repair a satellite which is in the same orbit but at a different inclination like 28 Degree to avoid collision. Now, what the International Space Station do was just to shift the point of intersection between the two orbits and gets transferred to the satellite orbit for repairable. This is called plane changes and is very important for fuel efficiency as well as orbital mechanics of the craft.

LAGRANGE POINTS AND RESTRICTED 3-BODY PROBLEM

It was Lagrange who conducted an experiment over the Lagrange points. They are 5 in number and comes in L1 - L5. This feature is very useful in rocket mechanics as it successfully proved a way for eliminating The-Three-Body-Problem. What is a 3 body problem? M1 and M2 are two giant

masses eliminating each other's force through the 5 Lagrange points. If M1 is Earth and M2 is Sun: Then the centrifugal force of the Earth's rotation and the gravitational attraction of the Sun will cancel each other out at the 5 Lagrange points. The most stable point is L1. It as is stable from the effects of Microgravity in space therefore provides a stable way of providing a position of satellites to place on them, so that there is no drag and lift force caused by the potential wall of the gravitation. Satellites are placed on this Lagrange points. They orbit in a Halo orbit surrounding the points and maintains their stability from microgravity in space. Back in the earliest days when Physics or Celestial mechanics is yet to be developed, Kepler discovered the relation between 2- bodies, the Sun and the Planet and how the Planet sweeps equal area in equal time along with Sun at one of the focus of the Ellipse which is a conic section. Further in 1700's Newton developed the 2-Body problem of planetary motion by combining Kepler's laws with his laws of motion and gravitation. That is Gravity depends upon masses and increases when two massive objects came closer and decreases by an inversely proportional square of the distance the bodies are moved apart from each other. In those days the relationship of gravity is confined between 2-bodies – The satellite and the planet. Or. The planet and the star. Like Earth and Moon or Earth and Sun. Now, gravitation as a part of angular momentum came into concept from the Einstein's General Theory of Relativity. Gravity distorts Space-time and makes the massive objects to spin in a moment of momentum around the distortion. But those days have gone.... Now Physics becomes more complicated with the invention of artificial satellites or space crafts. Now as soon as a satellite is launched into space then there exists 3-Body relationship between the Moon, Earth and the satellite. Or, The Earth, Sun and Satellite. Or maybe, The Earth, Jupiter and the satellite. So, Lagrange has developed a complicated solution by generalizing gravity into a 3-Body problem. The primary being Sun which has a higher dominance of gravity. The secondary being Earth whose rotation gives a centrifugal pull and the moon (although excluded) but still revolving around Earth which in turn revolving around Sun in a common centre of Mass. Yes, that common centre of mass is the equilibrium point of the "Cm" or the 3-Body centre of mass along which every object rotates or revolved in celestial mechanics. This intersecting common centre of mass of the spacecraft, Sun and Earth is called the Barycentre. Barycentre balances all the masses on a fulcrum and acts as just in the middle position of the centre of mass. 3-Body Problem has several ways of trajectory mechanics which helps to compute 5 Points in space among which 3 Points L1, L2, L3 at the Primary, Secondary and its middle makes a position of unstable equilibrium as when the primary and secondary objects move, this Lagrange Points also moves. So, for a stable equilibrium the Space-Craft is kept at L4 and it covers a halo orbit circling L4 and L5 in order to maintain stability by neutralizing the Gravitational pull of the Sun and centrifugal pull of the Earth. L2 points are also used for placing articulate satellites around the earth. It's complicated yet interesting.

IMPULSE

What is the most dominant thing in our solar system? Everyone will say The Sun... But there is another thing which is the sun's chromosphere, the plasma envelope that surrounds the core of the Sun and emits the radiation. There are some regions on the chromosphere which are called as Sunspots or the Umbra Part of the Chromosphere. This are the region where the inside temperature of the Sun's core are absorbed by the outside layer and makes a turbulent region over the Sun called as Sunspots. This region emits radiation. Tremendous radiation. The solar radiation. This is even accompanied by turbulent solar flares moving at a speed of 50 Km/Sec approx and accompanied by ionic electron and proton. This solar radiation is hazardous to any spacecraft orbiting the Sun. The atmosphere of Sun has two parts... The first layer or the Photosphere, The second layer or the Corona. The temperature of the outside layer is sometimes cooler and so the solar radiation gets absorbed and thereby providing dark spectral lines known as Faunhoffer Lines of the Sun's atmosphere. The heliosphere is the region dominated by the Sun. The heliosphere extends far apart from the earths atmosphere and comes to an abrupt end in a region called heliopause. Our magnetosphere is the region dominated by Earth's magnetic fields. The solar particles along with charged protons and electrons got attached to the magnetosphere and forms a donut shaped fiery region called Van Allen Radiation belts. This is a tremendous hazard to any orbiting spacecraft. Moreover the ionosphere is also affected by the Sun's atmosphere. There is a region of hydrostatic equilibrium which according to fluid dynamics is a region where the fluid (in this case air) flow remains constant. The Ground station which transmits radio signals to the satellite orbiting above the ionosphere or 1000 Km above the Earth's sea level for reflecting back by a phenomena known as Faraday rotation which is the interruption of the linearly polarized radio waves interacting with a magnetic field and thereby forces to return back to the earth without reaching the satellite. This is a threat to communication systems. The temperature is slowly decreasing above the Earth's surface upto stratosphere where the temperature is roughly -57 degree Celsius. But the temperature increases to 600-800 degree Celsius in the ionosphere which is very warm. The atmospheric pressure declines rapidly as a result of the thin gravitational pull from the Earth's sea level. So, Sun is a threat to the Spacecraft mechanisms but there are one alternative sources available. The effect of solar radiation imparts a momentum or pressure on the thin Fabric and the pressure becomes more as the fabric becomes thinner and thinner measured in per cubic centimetre of the area in terms of Pascal. The radiation pressure is almost nil in the earths low atmosphere but the pressure dominates from the ionosphere. In the region of magnetosphere to the region of heliosphere the pressure of solar radiation increases exponentially and even there is a region at the outer boundary of the heliosphere which is called the heliopause where the solar radiation got a higher intensity of several hundred pascals Along with a high speed of 100 Km/Sec called the magnetosphere. This is also a region which marked the region of bow shock that is the solar winds get supersonic or the Mach # is > 1. This bow shock is a region dominated by a high pressure with a higher density and this may provide a hazardous effect to any object getting near to it. But the impulse of momentum is extremely useful to a particular type of spacecraft which is made by a thin parabolic dish of fabric with a very less thickness of 3-4 microns and thereby makes the highest exposure to the Solar winds. The winds in turn creates a high pressure or imparts a high momentum on the parabolic dish fabric which will provide a potential source of power to the spacecraft which is driven by solar radiation pressure. The more it comes closer to a star or sun, the more will be the solar radiation pressure on its dish and the more power it can generate from the impart of the solar radiation's linear momentum. But this sort of a spacecraft is very difficult to be made as because to provide power to the craft the parabolic dish must have to be 1 Km in length and thereby is very difficult to accommodate in the payload of the rocket prior to launching it in the orbit as because the more the dish area, the more the radiation exposure, the more the power of the spacecraft. Well, this type of spacecraft may prove useful to the future generations which can only fly by means of the linear momentum of the solar radiation without any liquid hydrogen, oxygen, nitrogen, kerosene and Momomethyl Hydrazine as a fuel.

MAGIC OF EPSILON

ε - This symbol is known as epsilon and stands for the eccentricity of a conic section. Energy is proportional to the eccentricity and hence it is this energy which is required by a spacecraft to orbit a planet or to make a interplanetary swing for an alien planet. Energy is of two forms, kinetic and potential energy. Potential energy is the energy of a body under gravitational influence and kinetic energy is the energy of a motion. A circle is the first orbit that a spacecraft should orbit for the initial trajectory. In a circle the eccentricity is zero. Angular momentum is conserved as it is inward to its radius $\{ r \longleftrightarrow \}$ and so no torque is assembled over there. Now the eccentricity will be increased but it's less than 1. {0>ε<1} Hence the potential energy is negative due to the opposite accuracy wise force of the gravity that drags the spacecraft down. Now after that the spacecraft will move to a region whose eccentricity is 1... That is a Parabola. The total energy becomes 0. The more the spacecraft moves in parabola towards the apogee keeping the perigee fixed the more the potential energy decreases and it comes to zero. Kinetic energy will also becomes zero and hence the planet is free from gravitational pull hence the escape velocity is achieved that is 11.2 Km/Sec. Now comes the crucial turn: The region closer to Directrix.: That is where the kinetic energy is infinity and so the spacecraft will enter the alien planet or destination planet by gaining energy. No energy is loosed in the process except potential and thermal energy (which is ignored). The spacecraft will acquire a parabolic orbit of the alien planet. That's the celestial mechanics.

STABILITY

A satellite when stays in its orbit suffered different types of drag. From the microgravity of the Earth that dominates on this space, from the drag of the centrifugal force of the Earth's rotation and even from the high gravity potential of the Sun. Moreover the shape of our earth is an oblate spheroid with a 21 Km bulge at the equator. So, when the satellite is moving surrounding the earth the equatorial region gives the satellite a more gravity attraction than the polar region. This causes nutation or conical vibration which tends to low the satellite from its desired orbit. Apart from all these, there is a tendency of the satellite to depart away from its orbit in time due to small perturbative forces of the solar radiation that alters the path. Solar radiation consists of high speed ionic electrons and protons along with solar flares which hits the solar arrays along with the main body of the satellite with a speed of 100 Km/Sec. Now what can be done to stable a satellite so that it can stay in its orbit for a longer period of time with a minimal drag? Newtonian Dynamics along with celestial mechanics gives the answer to this question. A distance if derivated with respect to time will give velocity. The velocity if derivated with respect to time gives acceleration. So, acceleration is the second order derivative of distance with respect to time. Now if the acceleration can be made a third order derivation then we will get what is called a jerk. This is the jerk which causes imbalance in the momentum of the vehicle. The momentum is of two parts. If it is a range like velocity which imparts the momentum then this is called a linear momentum which can be expressed as a product between the mass and distance in its second order derivation with (t). Now when the momentum has a moment in its centre then this momentum can be called as an angular momentum with can be expressed as the cross product of distance vector along with velocity vector which is changing . Earth rotates or earth has its angular momentum or rotation which gives its stability just as a bicycle wheel rotates or a spinning top rotates for their stability to say with the ground. Satellites are also the same – They have a momentum bias. The moment of momentum which helps them to stabilize in its current position. But still there are many perturbative drag forces which disrupts their momentum. So, in general when a satellite rotates along its (Z) axis then the (X,Y) axis is relatively fixed without any moment of momentum. Due to small nutation a jerk will produce and cause the satellite to deviate from its present acceleration. If the satellite is fixed without any angular momentum and if it's normal spin axis is considered to be nothing.. Then the inertia will gather along its $(I)xx$ $(I)yy$ $(I)zz$ axis which if disturbed will cause a momentum between any such axis which can be best describes as a cross product of the distance vector from its centre along with the velocity vector from its centre. This in turn will produce a torque in opposite direction which will cause the satellite to drag down. Sometimes a hybrid of despun satellite is used whose one surface remains in a ball bearing position with the other surface such that the rotational momentum on one surface will cancels out the torque in the other surface and the satellite got a momentum bias on one side along with a non-momentum bias on the other side such that – Sometimes thrusters or small rockets are used for path correction when required by there the momentum which is imparted on a thruster in one side should be neutralized by the momentum imparted by the thruster on the other side in order to maintain rotational bias stability.

VI. Examples Of Lunar And Martian Landings

LUNAR LANDING BY APOLLO

The Saturn V Rocket lifts off to space and then in the upper Earth's orbit ejects the Lunar-Command-Module-Adopter along with the S-IVB Rocket engine which gives a throttling and transfers the whole adopter to the Lunar Injection Trajectory. Then at the Low Lunar Orbit the command module gets distracted from the adapter of S-IVB which makes a 180 degree sharp turn by its rotational thrusters and got attached with the Command modules left aft docking port by a series of 12 Latches and 6 hooks. Once the CSM attached with the LEM then the umbilicals of the LEM and S-IVB got disconnected and the LEM got free from the fourth stage of the launch vehicle Saturn-V. The LEM-CSM made a low orbit trajectory by a translational projectory in order to make the Periapsis more closely keeping the apoapsis fixed. Then the LEM got separated from the CSM and the Lunar Service Module gets closer to the moon surface with the help of its down faced thrusters for aerobraking along with RCS or Reaction Control Jets for proper landing in a decent place free from rocks and craters. The LEM finally landed there. 2 astronauts remained in the LEM and 1 astronauts remained the CSM. The LEM or lunar excrusion module has two parts: The ascent and descent parts. While leaving the moon, the descent parts along with its 4 legs and heavy fuselage got jettisoned from the ascent stage and the ascent stage rises to catch the CSM. The ascent stage has a insulating cover with a docking port along with the fuel Momomethyl Hydrazine and oxidiser Nitrogen Tetroxide which helps the

propulsion upwards. The periapsis increased with the apoapsis remaining the same. The ascent lunar module then rendezvous with the CSM or Command Service Module and a pressurised tunnel is established in between the LEM and CSM. Then the 2 astronauts opens the umbilical hatches of the LEM and got transferred to the CSM. Then the Ascent Lunar Module is jettisoned and the CSM or Command Service Module got transferred in a C-3 hyperbolic trajectory of excess velocity to get into the Earth's surface and makes a splashdown to the Pacific Ocean.

ROVER LANDING ON MARS

MSL (Mars space laboratory) entered the Martian atmosphere with an immense speed. The heat shield activated and is ready to guard the MSL. MSL consists of a Rover called CURIOSITY ROVER and SkyCrane... The temperature is increasing to 1300 degree Celsius. The air flowing past the heat shield broken the molecules of the air and thereby formed an electrified plasma around the blunt cone of the heat shield. The temperature continues to rise and the heat shield catches up fiery yellow colour. The speed is 1200 fps and then suddenly the heat shield got jettisoned from the MSL. The aerobraking system takes into control by the opening of a parachute behind the MSL. The shield got crashed in the cold Martian surface. Temperature becomes to fall and approaches to -50 degree Celsius. The cold Martian atmosphere has a density of 1% compared to that of Earth. The parachute got jettisoned and flown away further. Now, The SkyCrane takes over the control. The rover is free falling under the SkyCrane and is attached to the Rover by means of 2 umbilical cable and 1 bridle for the controlling of maneuver for a safe landing into the Mars. The RCS (Reaction Control Jets) fired up from the downside of the SkyCrane in order to provide a temporary lift by reducing the drag force due to Martian Gravity. It continues to fall and when it is just 100 ft. From the Martian Surface.... The instantaneous change in the temperature occurs which is protected by the insulation coverage of the Rover. The thrusters are solid boosters and so their speed of throttling also decreases. Now, the radar on the Curiosity Rover got activated and a perfect landing spot is made available by the GOC (General Purpose Computers) of the rover. The speed is now 5 fps.... The SkyCrane adjusts its angle of maneuver and makes the rover touches the Martian Surface. The bridle and umbilical cable got separated and the SkyCrane got a flyby trajectory in order to get crashed at a safer distance from the Rover in order to prevent direct contact with the Rover. The Rover then opens up its Legs containing the wheels and the camera on the robotic head along with the solar panels for the supply of electricity. This SkyCrane concept was first introduced by USA in Martian Landing of the Curiosity Rover. Previously a direct crash landing is occurred after the rover got jettisoned from the orbiter. There were a number of airbags around the rover. This airbags protect the rover from the ground friction and hence the rover which is approaching at an immense acceleration due to gravity bounces very rapidly with a high frequency. It got displaced about 1-2 Km from its initial landing spot. There is also a danger of getting it into a crater. After the bouncing stops the air bags were automatically punctured and the rover directs its correct attitude in order to examine the Martian Surface.

Figure 11: Curiosity Rover on SkyCrane. (*Courtesy: NASA*)

VII. Beyond The Rocket Propulsion: Secrets of Electrohydrodynamics

Einstein in 1916 discovered the equivalence between gravity and acceleration in his particle in a box experiment. The box is presumably a elevator and the particle is the human. Most of you have noticed that when the elevator or lift moves upwards you feel heavy. When the public bus suddenly stops, your upward portion leans frontward. This is because of the acceleration which is behaving as gravity and it is acting non uniformly in our body. Therefore, the rockets having a velocity of 8 Km/Sec or more like 12 Km/Sec or even the reentry Soyuz capsules –The astronauts in them suffered an acceleration of 4g (corresponding to 1g Earth gravity induced acceleration). Now you can imagine that, anyone who is in a spaceship travelling at a speed close to that of light is experiencing immense acceleration which imparts immense gravity non-uniformly on the body and makes it shrink or elongated and ultimately into pieces. The nearest solar system or exoplanetary solar system is about 300 approx light years away and if the aliens come to earth from that then with a speed of 3,00,000 Km/Sec they would need to travel for 300 years which is absurd. Because nobody can survive in this high acceleration induced gravity inside the spacecraft and also nobody can survive for 300 years. So, aliens visiting Earth must have speed greater than light with a uniform but vanishing negative gravity potential. This violates the norms of relativity and things started to get interesting. The Aliens used Anti-Gravity Technology which surrounds the spacecraft with a repulsive gravity potential and makes the field uniform in all aspects and in all frames of reference. Therefore, the Produced Anti-Gravity which shields the spacecraft and provides power to the UFO acts uniformly on every atoms of the Alien bodies and spacecraft's and as its "Anti"... So, it prevents them from collapsing.

Some basic Physics questions come to our mind when we are discussing about UFOs – Why UFOs are not as huge as a rocket? Why UFOs are always disc shaped? Why UFOs are travelling at such a high speed as if they have to come some thousand light years away from a huge distant planet within a normal lifespan of living beings? How could a UFOs carry such a small amount of fuel as their size is comparatively smaller as because a fuel usually takes up 70% of a rockets mass! This means the UFOs will be tremendous in size but they aren't? Are the UFOs using technology of perpetual motion machines that modern physics is still unable to answer or are there any new form of propulsion technology they are using?

Let me describe a brief explanation of what exactly a perpetual motion machine governed by Electrohydrodynamics configured in reality – Generally unlike other forces, gravity is a monopole. But can we induce dipole in gravity like there must be some potential difference between the two poles, one which is attracting and other which is repulsing. This concept can be treated as attractive gravity or G-Well and repulsive gravity or G-Hill. Suppose you have a canonical truncate shaped disc which is convex in the leading edge and flat in the trailing edge. A total of 1,000,000 million Volts of DC with alternate pulsating frequency or Off-On is applied to the disc. The upper edge of the disc is the anode or the positive electrode and the lower end of the disc is cathode or the negative electrode. The protons or ions emanating from the anode will follow backwards due to the attraction from the negative ions from the cathode. A convergence of ionic wind will be formed from the anode to the cathode. The surrounding portion of the air gets ionized with a heavy electrical shielding and a deep blue glow just as the comets tail when reacted with the electrons or cosmic ray's formed a long blue tail. The portion which is the middle hole of the cathode will have a gravity well formation. But we know that our earth is a G-Well or Attractive gravity. Therefore, if gravity is polarized and the G-Well of the Vehicle interacts with the G-Well of the earth, the result is the repulsive gravity. Just like same charges repulse themselves. This will create a forward thrust and the vehicle will be kicked out of the Earth's surface within seconds. The SOI or the Sphere of Influence of a Planet stretches millions of kilometers from its radius. Therefore, the artificial gravity that has been created in the leading edge will try to act the vehicle upwards and the repulsive gravity will kick the vehicle from downwards. As if an invisible gravity shield has been established at the top of the vehicle attracting the vehicle from the top. Now, imagine that the vehicle is entering from one planets Gravity pull or SOI to another planets gravity pull. The stronger the gravity the more the repelling. Moreover, in the hard vacuum of space the ions can distribute freely without any opposition of the neighboring gas and this will increase the speed of the vehicle exponentially. A negative inertia is created in the just below center of the vehicle due to the pinpoint of ionic convergence and compensating the G-Wells. The antigravity of this region is greater than the surrounding regions and hence the repulsion to upwards occurs more in this situation. Thus Electrohydrodynamics establishes an unification of gravity with electromagnetism. Sometimes, AC can be superimposed on DC for a better thrust as dielectric relaxation will take effect properly. A Barium Titanate shield can be used in between the anode and the cathode as a high K-Dielectric.

SOME REAL LIFE EXAMPLES

Example 1. ARV – Alien Reproduction Vehicle

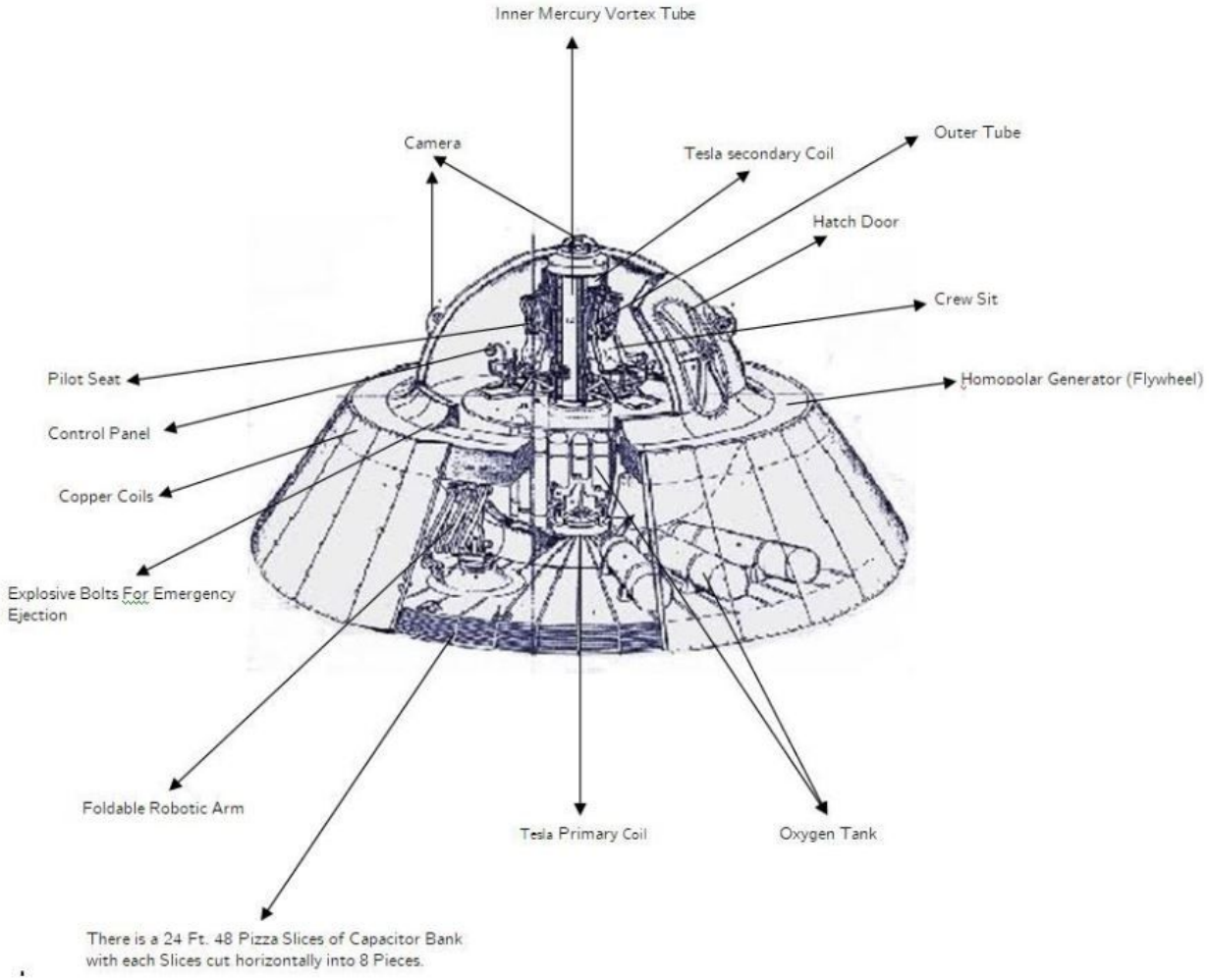

Figure 12: Schematics of an ARV (Alien Reproduction Vehicle) showing its all component parts.

The shape of the vehicle had been cleverly designed, so as to harness the ZPE (Zero-Point-Energy) of the nature. The vehicle, been highly energized, has to be covered with a lead coating on the outside, to prevent, the high energized X-rays, other UV radiations get inside the vehicle harming the crew and the pilot inside. Therefore, there are cameras outside the circular doom or the pilot-crew cabin, and the pilot has been wearing a glass which provides a 360 degree view of the ambient vehicle space. At the base of the vehicle there are pizza slices of capacitor plates arranged in a (Brown-Biefeld) configuration, as Negative on the bottom and positive on the up. There can be more than 8 capacitors arranged in this fashion with each stacked over the other. There is a giant Tesla coil powered by a DC-Battery of 24 Volts with a Spark Gap and Capacitors with the Primary coil just placed in a gap above the capacitor banks of the base. The secondary coil would act as an amplifier with the discharge to the cathode of another metal column placed inside the secondary coil. The charges from the cathode to the bottom will move up to the anode at the top of the column. Inside that column, there is a third column with its top as a Venturi with a design like Amphora. These columns are filled with Mercury Ions in a partial vacuum state. Now, the crew chamber must be spherical to distribute the pressure equally over all the surface area. And the middle disk (the diametric disc or flywheel) that is attached with the column acts as a "Homopolar generator" with a high rotating speed that centrifuge the electrons to the copper coil turns at the diametric disc edge. There is ample oxygen supply for the crew but the oxygen cylinders have to have an insulated coating. There are 1 crew and 1 pilot accommodation in the spherical dome. There are 2 seats for them with the pilot having 2 types of controllers, a Potentiometer to control the charges of the capacitor and a spherical shell which can rotate 360 degrees, inside which is a laser diode that while revolving the shell, directs the light to the fibre optics attached to the shell, and these fibre optics have been attached to a Relay, that connects to the censors attached to each capacitor plate at the base. If the shell, is rotated right-side, the fibre optics activated the relays, which in turn activates the censors to the right hand side of the capacitor plates, and power is drawn to that side, which makes a movement in the right

hand side. Like this way, through the shell, a 360 degree movement could be achieved. Now, as expressed in the explanations, the craft could achieve a warp drive through local distortion of space-time, as a 3- Phase shift function, the Mercury Vortex, The Base Capacitors, The Diametric Coils of the flywheel. The field of the Tesla coil have to be in unison with the mercury of the inner tube. The mercury on high voltage circulates the innermost 3rd column in an orientation opposite to the just outer column inside the secondary coil. This in turn creates a vortex of circulating mercury ions in between the Amphora handle subject to high voltages. This creates an absorption point of the ZPE both from the inside and the outside reducing the mass and inertia of the vehicle making it almost massless, and the velocity increases the more, the more ZPE could be harnessed which in turn reduces more mass making a superluminal vehicle in warp bubble. Perhaps this ZPE, interacts with the Higg's field and creates a 10^{40} Joules of energy to remove it almost completely from the vehicle, making it mass less, however, this is not yet understood properly and is just an assumption.

Example 2: SEG – Searl Effect Generator

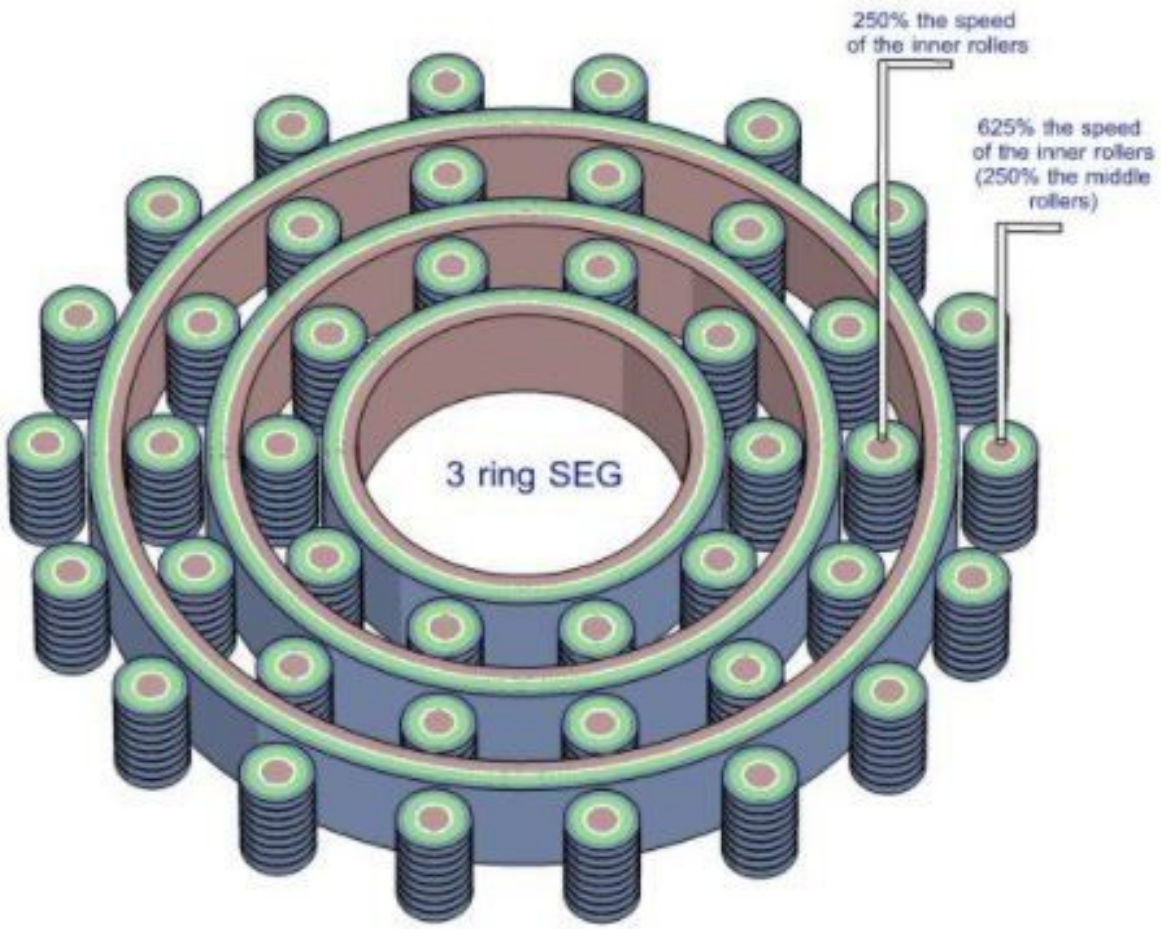

Figure 13: Searl Effect Generator. (Courtesy: http://www.energybusinesseurope.com/searl-effect-generator-seg/), (https://segsociety.org/), (https://searlsolution.com/), (https://www.pinterest.com/pin/96686723231553376/)

There are 2 components. The middle circle and the rollers. The middle circle concists of inner NEUDONIUM CORE with abundance of free electrons surrounded by TEFLON which absorbs the flow of electrons which is again surrounded by FERRO MAGNETIC MATERIAL covered by COPPER PLATES. This is again surrounded by 32 ROLLERS of the same material but 5% size of the inner circle. This rollers have a magnetic moment of North upwards while the INNER CIRCLE has a magnetic dipole of North Downwards. The whole thing is surrounded by a strout of LIGHT CONDUCTIVE ALUMINIUM BLADES WHICH IS CONVEX IN UP & CONCAVE IN DOWN. The middle portion which is surrounded by NEUDONIUM consists of the chamber where the person can control the vehicle. The mechanical clutch of 5 KILOVOLT is needed to control each of the

32 rollers which gains acceleration upto 5500 RPM and generates upto 100 Kilo Volt AC which makes the rollers gaining centrifugal acceleration and consuming less power from the mechanical motor clutch. The roller when rolls in its axis generates a sinusudinal waveform with the reference frame respect to the inner circle which makes the electrons from the inner core travels to the outer roller which when rotates dissipates the electrons outwards. Current flows from Positive to Negative and the outer peripheral electron ionized the local vacuum which in turn makes the electrons attracted to the positively charged protons inside the NEUDONIUM CORE. This continues as a perpetual machine regarding the flow of ions which makes the G-on accumulated at the boundary which makes a circular cylindrical shell of blue light and corona discharge which absorbs the heat from the surrounding and makes the inner core cooler. The pressure at the centre drops exponentially upto 6500 RPM & then the ambient anti-gravity shield (negative gravitational mass) becomes more gravity free than the exact point at the centre. The gravity at the centre ripples with the Earths G-on and the vehicle develops a bass in voltage along with a gravity well. The space craft will levitate surrounded by a shield of negative gravitational mass or electrons which arcs back to the inner core making the coronal discharge. The rollers absorbs heat from the surrounding and the heat of the kinetic energy gets converted into the mechanical energy which in turn creates an acceleration which makes the rollers rolled in it's own axis as well as the circles axis. The spaceship levitated as the ether wind develops the current of Electrogravity and it can carry 20 metric tons of mass in its anti-gravity shield. The ambient gravity free zone is 6 meters up, 6 meters down, 3 meters vehicles diameter. Earth's gravity gets distorted within 15 meters of the vehicle into a rhombus type zone and the exact down force of Earth's gravity counteracts with the upward force of the ion winds. The rollers magnetic field is repulsive to the inner circular circles magnetic field and this helps the rollers to prevent from touching the inner circle thereby avoiding frictions. The whole space craft acts as the MEISSNER EFFECT of Type I SUPERCONDUCTOR with the magnetic field lines diverging and converging making a toroidal electrogravity field with respect to the vehicles origin. The vehicle will have a very high rate of angular momentum and as it levitated, its acceleration increases because the concentration of G-on decreases with altitude. The vehicles acceleration can be slowed down by providing 7 Kilowatt load to the rollers which will counteract with the existing electrogravity field and dampen the oscillating sinusudinal wave.

The Neodymium core is the receiver which receives the ambient electrons and coupled with it's own electrons by forming a BOSON PAIR which travels in between the lattice points of atoms without any friction via rotating around magnetic flux lines. The next layer is Teflon which acts as a GATE by allowing the Boson pair to move and accelerated their speed and restricted the fermions or single electrons. The next layer is ceramic magnet which produces a Sine magnetic wave which is travelled into copper which emits the Electron Pairs or Boson Pairs to the Rollers. The same thing is happening in Roller and this created an Eddy current. This Eddy current flows through the negative Rollers to the Positive next neodymium core which again passes the Boson Pairs via Gate, Generator and Emitter to the Rollers which again creates Eddy currents and this process continues until the current reaches the C Ferromagnetic wrapped with copper coils. From there electricity can be generated. After 550 RPM, even if the AC or DC supply is disconnected, the SEG will run and accelerate by creating or absorbing THE ENERGY FROM NATURE. This is the real source of ZERO POINT ENERGY and this might be the Power giver of UFOs.

Example 3: Podkletnov's Gravity Impulse Generator

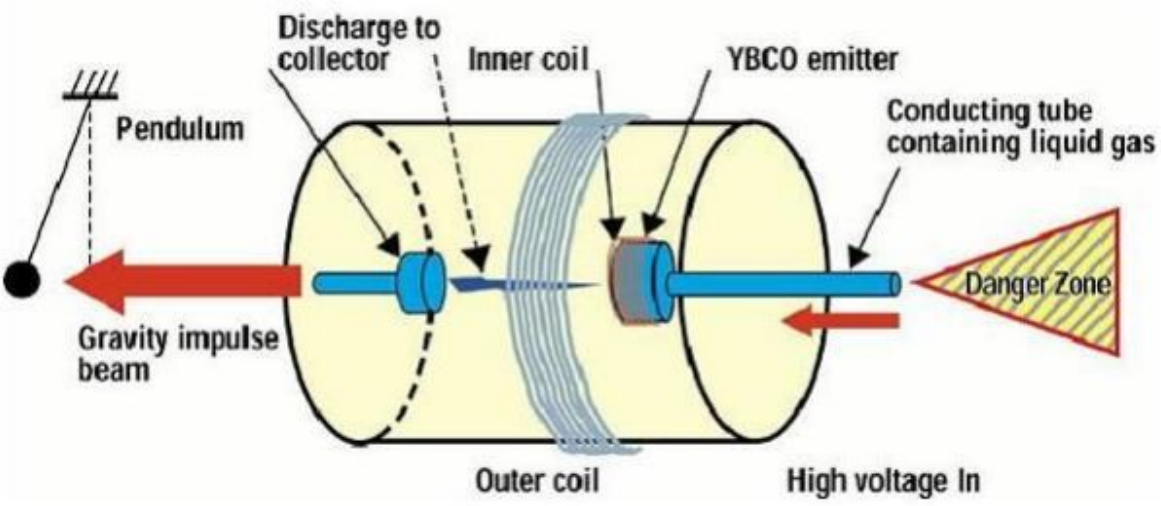

Figure 14: Podkletnov's Gravity Impulse Generator with working principle. (Courtesy: http://energia.moebius.com.br/oo/Energia/ENERG4L-antigravity/Eugene%20Podkletnov%20-%20Russian%20Scientist/Podkletnov%20Interview%20(EN).pdf)

Nicola Tesla in his Colorado springs laboratory made two large Tesla coils with one magnified the other. It's called Tesla's magnifying transmitter. This produces a huge corona discharge. A huge spark gap produces this discharge. But this is not the fact. There is one surprising fact that Tesla

observed is Anti-Gravity Impulse. Tesla said that during the discharge, he said to feel a huge force in his chest and back. He enclosed himself in a glass box and said that he still feels the same pressure forwards. He went to a great distance and still feels the pressure on his chest. The force exists as long as the transmitter is in operation. Tesla also said that the force is linear and not only he but some small objects are kicked out from table due to this unknown force. What is this force? Theorist Paul Laviolite said that this force is gravity. Or in other hand high electric potential differences creates a high gravity pressure which Tesla observed. Could it be that Gravity & Electromagnetism are related somehow?

Podkletnov's research is based on Impulse Gravity Generator Based on Charged Y Ba^2 Cu^3 O{7-Y} Superconductor with Composite Crystal structure, Podkletnov discovered the same thing like Tesla as gravity beam generator which shows that the gravity discharge is 64c or 64 times the speed of light when modified apparatus like Gun diodes and waveguide box, magnetic resonance amplifiers were used. This clearly defies Newton's third law as there is no recoil but still the wave moves at such a high speed defying special relativity. This shows that there is an existence of etheronic wind which moves along with the longitudinal gravity waves in compression and rarefaction. The etheronic wind doesn't also support inverse square law but supports the decrease with radial distance 1/r according to Semi-Quantum kinetics and Electrohydrodynamics. Later on this wave has been said as sound wave on electrified ether. Microwave phase conjugation has been used in the materials of negative permeability and negative magnetic permittivity with a negative refractive index. When sawtooth waves of high potentials are discharged from cathode, they get amplified over a resonance wave and discharges the shock via anode. The resulting etheronic gravity phase beam in form of microwave energy is used to levitate objects in air. The strange thing is that, it disapproves and violates Newton's law of motion, 1^{st} and 2^{nd} laws of thermodynamics and theory of relativity.

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