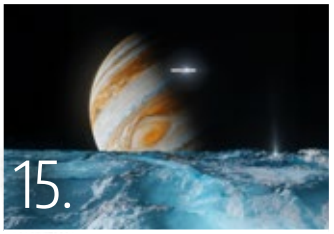
# Space PLANET









PRE-LAUNCH SAMPLE

The magazine of choice for Space Professionals

ISSUE
Q1 / 2025

# EVENTS CALENDAR 2025/26

For more information about all events visit WWW.SPACEPLANET.ORG

| | | |
|---|---|---|
| MARCH | **NORDIC SPACE SUMMIT** | Stockholm, Sweden (19 March 2025) |
| APRIL | **MILITARY SPACE SITUATIONAL AWARENESS** | London, UK (28–30 April 2025) |
| MAY | **SMALLSAT EUROPE** | Amsterdam, The Netherlands (27-28 May 2025) |
| JUNE | **MILSATCOM** | Arlington, VA, USA (16-18 June 2025) |
| AUGUST | **ANDØYA SATELLITE SUMMIT** | Andøya, Norway (25-28 August 2025) |
| SEPTEMBER | **SPACE LOGISTICS CONFERENCE** | Arlington, VA, USA (18-19 September 2025) |
| OCTOBER | **SPACE-COMM DUBAI** | Dubai, UAE (6-7 October 2025) |
| NOVEMBER | **GLOBAL MILSATCOM** | London, UK (3-6 November 2025) |
| DECEMBER | **SPACE-COMM SCOTLAND** | Glasgow, Scotland, UK (3-4 December 2025) |

**My name is Richie Enzmann. Allow me to welcome you all to the latest issue of Space Planet!**

# WELCOME TO SPACE PLANET!

**Dear Reader,**

You are reading the Pre-Launch Sample Version of the Space Planet Magazine Issue 1. This is to show what I am aiming to achieve and all about – my goal is to make humanity a multi-planetary species.

You will read about the fascinating story of Dr. Robert Duncan-Enzmann, who worked with Wernher von Braun both in military and civilian projects in the USA. However, Bob has never been in the limelight and decided to stay behind in the shadows. However, after his recent passing now we can shed light to some of his work that has the possibility to change the future of mankind. He had several spacecraft designs of his own. In this issue 01, you will get a glimpse of the Echolance, that is to be the backbone of future intergalactic travel.

There is much-much more interesting stories and information to publish once we start up with the finalized magazine.

But in the meanwhile, I very much hope that you like reading this new sample publication and please get in touch with me for any feed-back, suggestions, or articles you may have in mind.

Best regards,
**Richie Enzmann**

# TABLE OF CONTENTS

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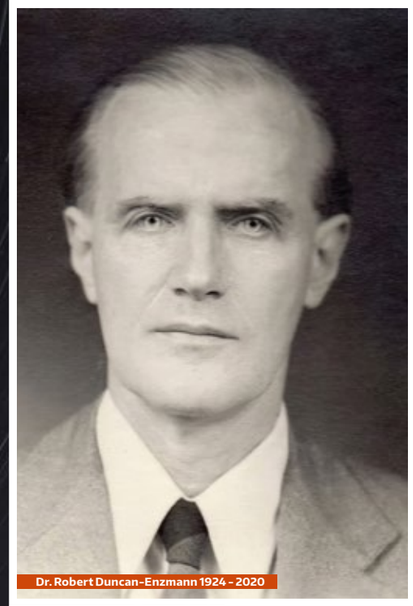
# THE MIGHTY MIND OF DR. ROBERT DUNCAN-ENZMANN

## INTERPLANETARY COLONIZATION: THE ULTIMATE ENDEAVOR



Dr. Robert Duncan-Enzmann 1924 - 2020

**MICHELLE SNYDER, VP FREA**

Meet the Mighty Mind of Dr. Robert Duncan-Enzmann. It is a rare treasure, one that could have brought – and still can bring humanity to a very different reality. A smarter reality. The knowledge from this Mighty Mind can result in powerful changes in our world, but that is up to the people who take action using it. The commitment and enthusiasm of the pioneering public is crucial to any world changing effort.

### THE SKIN OF THE SPACE RACE

In a tutoring session one day with Dr. Enzmann I received some instructions. He wanted me to take notes for a letter he wanted written. I asked for whom it would be written, he said, The World. I told him the world was a big place and asked how I was to accomplish this task. He said, "that's easy." It is one of his favorite retorts, but he never tells me why it is easy. In applying some analytical thinking to this request, I realized that what he meant was to write an article to our readers. He assumes one day they will be the world.

Dr. Enzmann, whom I am privileged to know as just Bob, has been my teacher and mentor for decades. He is a good teacher, but a difficult one. He asks rhetorical questions and what if's and expects an answer. He never gave me the answer, at least until I became so exasperated that he gave me a hint. I have said many times that his teaching style frustrates and exacerbates his students so much that they never forget what they learned. It works, but most of his students go away angry and don't come back. I always understood the value of what I was learning, and I stayed. For decades.

In his room, where all teaching took place, we were having a conversation about starships.

"Take notes," he said.

I found some printing paper and searched for a pen. He only writes with black Micron 01 marker pens, so that is what I found. As I sat, pen ready, Bob explained that he wanted to solidify our (Jay and Michelle Snyder's) place in the world's eye as the primary party in relationship to him.

He stated: ontology recapitulates phylogeny.

Being used to his seeming-change-of-subject conversations, I wrote that down. He gets his rabbit trails connected eventually. Our conversation proceeded in its usual pain-in-the-butt fashion until I figured out what ontology and phylogeny were. Then came the hard stuff. His questions.

BOB: "What is the nature of skin?"

ME: "I know it is the biggest organ in the body."

BOB: "What does it do?"

After several mumbled and botched attempts at defining this, interrupted by his commentary aimed at directing my thoughts, I said, "Skin contains you?"

This must have been close enough to the right answer for him to offer an explanation.

"Good!" he said. "Skin defines you. It separates you from non-you. Self from non-self."

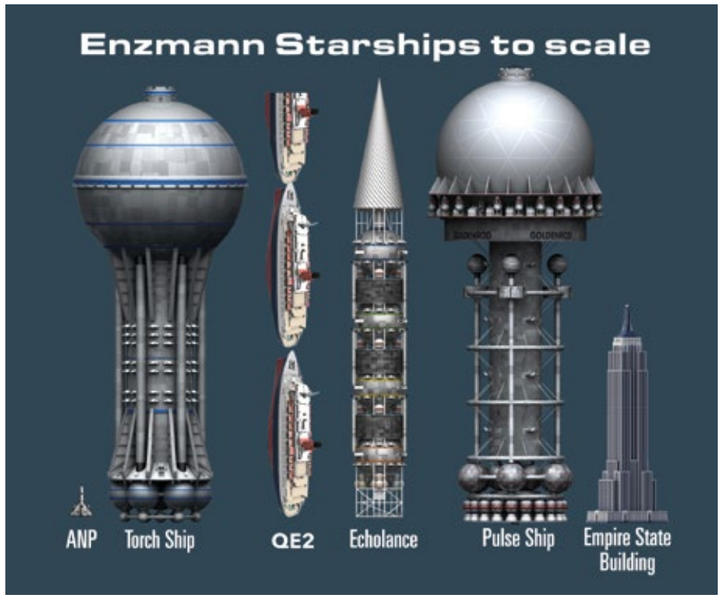
Years ago, he had taught me that all humans start as a blob of skin, and that the body forms on the inside of the skin, creating holes (gates) and appendages. I said as much. He must have sensed that I wondered what this had to do with starships – that was how the conversation had started.

"I am telling you this as an example of my way of thinking. Ontology recapitulates phylogeny. In other words, how a baby develops is how evolution from lungfish to human also works. This thinking applies to how I approach starships. There was no chaos in the process; decades ago, with order and method, we, Joanna (his brilliant wife) and I, created the skin of the space program."

He sat for a minute looking at me, perhaps he can see when something finally sinks in, or perhaps he just waits a random amount of time.

"I think methodically. There is an orderly development of starship technology. You know what the Orion Project was. At first it was an unmanned space probe and had one engine. I knew that if we had four engines it could take a man! If it had eight engines, it could travel the stars!

From the Orion probe, engines added, was born the Torch Class ship so popularly called the Enzmann Starship. The steps to its conception were orderly. All done methodically. Chaos must become order before there can be progress."




Another silence, this time for me to appreciate the picture he was painting.

Then he listed his starships for me, in order. There are stories about each of these in his Archive, to portray what life would be like in them. We call these stories Wagon Train to the Stars, and they take place in the Enzmann Universe. The first ship began as a Zeppelin. The stories are science fiction, but the ships are not.

1. Mammy Ship
2. Orion Probe
3. Enzmann Starship
4. Micro Ship
5. Mini Ship
6. Little Ship
7. Proto Echolance
8. Echolance
9. Inertial engine

Bob wanted to be sure I knew what a starship was. He stated that by definition a starship can transit between stars and survive on a minimum landfall, which is the worst possible but survivable environment with a star and a moon, and a starship has the technology and resources so the crew can reproduce the ship. Redundancy is critical.

In the Enzmann Archive are diagrams, papers, illustrations, stories, and engineering workpapers about all those ships, and more recent designs. The Enzmann Starship, the Pulse Torch, has become an icon in graphic art.

Humanity must, as we are driven to do, explore the universe. Humans will reach our next stage in evolution when we have planted colonies on terrestrial locations and in starship city-states. There we will start a race of those born of humans, but not Earth born. Bob and Dr. Robert Goddard believed this would be as huge a step in our evolution as when the lungfish crawled onto land and learned to walk.

It is time to leave the cradle, and it will take order and method to create the means to do so – the same order and method whereby a baby develops from skin to human.

Before I said goodbye to Bob that day, I was taught how a shovelful of quartz sand could power a starship for a thousand years. I think he was just keeping me humble – there is always more to learn from his mighty mind.

## ENZMANN AND SPACE

The means of interstellar flight were developed by 1955, but never manifested. Why? We had been to the Moon multiple times and then the program was dismantled to the point where we could not even launch men into orbit. More than 50 years after the Enzmann Starship was designed, Space X finally launched two men to the Space Station from the United States. Perhaps we will relearn how to get to the Moon then go to Mars. Almost all those that knew how are gone, leaving behind only their legacy. And then there is the Enzmann Archive.

Enzmann insisted in 1960 that it would be absurd cruelty if humanity waited for centuries before voyaging to rich new worlds with resources waiting unused, like the five-hundred-year Dark Ages in Europe. "Let's go to the stars in our generation," he demanded.

In the 1980s the construction and launch of starship fleets could have been accomplished without major technological breakthroughs, at surprisingly affordable cost, in a relatively short time, and with many beneficial consequences for all people on the Earth, as well as for those who opened up the cornucopia of interstellar space.

This is a plea to open a new frontier for mankind. We need the space, the freedom, the new lands, the possibilities of adventure, the resources. It's time to see Space as the threshold of a vast new frontier – the ultimate endeavor for mankind – and discover what will come of him and after him.

It is the solution to a growing population, extreme changes in the climate, a host of planet-killing asteroids in our goldilocks zone, and likely will be the next evolution of the human race.

"But we have problems on Earth!"

The truth is that research and development for space exploration covers vast areas of human life and would solve many of the challenges our Earth has. Canceling this research (in 1963) has set our progress back more than 100 years.

The reasons for urbanizing the solar system and concurrently opening a new age of exploration and discovery are as crucial as were the reasons for digging individual wells in rural areas, installing water and sewage pipes, building railways, installing urban and rural electrification, and producing antiseptics and anesthesia for hospitals.

Enzmann wrote: "I am both an escapist and an explorer. I was introduced to and studied rocket fuel at the age of five. As an adult I worked with von Braun and his team to manifest the Grand Design: That mankind goes to the stars. This will be akin to the fish migrating to live on land and evolving therefrom.

"Many people who are alive today will be aboard starships launched out on the long passages to neighboring stars. Manned starships are a certainty in the very near future. Voyaging to the stars is, along with space technology, an historic force compelling us to star flight, and most importantly, practical methods of starship propulsion.

The technology to build starships is here now and has been here since 1945 when the first atomic bomb was triggered. Enzmann witnessed the bomb over Hiroshima, and his thoughts were not about war, as it was over, but that what he had just seen was the power to launch us into space. Nuclear power had been demonstrated as a powerful force of destruction, but the idea, put to constructive use, would mean launching to the stars.

Perhaps you think interstellar travel is a luxury. Dr. Enzmann said that colonizing space will be the salvation of the human race. Humanity can afford this endeavor – our Gross Global Product could support a dozen adventures like it; is now supporting a far greater allocation of resources and energies put into, for example, arms and armies that largely cancel each other out.

It is only a matter of deciding to go ahead with it. And that is not all that hard. It may not be human nature to vote for large expenditures for a remote and doubtful profit, but neither is it human nature to trade in a perfectly good car every year for a new one. Human nature is what we humans make it. Public passion is the key to building a space-faring civilization. If the public is passionate, then even a reluctant media cannot stop the manifestation of what the people want.

## ENZMANN'S LIFE & EDUCATION

Robert Enzmann was born in Peking, China in 1924 to Ernst von Enzmann, a WW1 Austrian Officer escaped from Siberian Prison, and Florence Goodman, a Johns Hopkins exchange nurse from a shipbuilding family from Bath, ME. His father was a Physiologist (Ph.D. Harvard). He spoke several languages. They lived just outside the walls of the Forbidden City and worked for the Peking Union Medical College when Robert was born. Robert had one sister, Jane.

His father, from Sudetenland, Austria, married Florence Goodman, twin daughter of a ship's captain out of Bath, ME. She was a Johns Hopkins graduate working under a Rockefeller program for medical nursing exchange at the Peking Union Medical College, ca. 1920. Ernst was an Austrian officer in Franz Josef's Army. He was captured on the Eastern front during WWI and taken to a Siberian prison. After a long and arduous escape on foot from Siberia (Siberian Prison, by Ernst v. Enzmann) he met Florence while interpreting English for the Chinese at the Peking Union Medical College.

Robert was born in Peking at a time just before the electrification of the city, and before the introduction of the motorcar. Life there was similar to life in the United States in the mid-1800s.

The embassy school exchange program began in kindergarten. By the age of four Robert, like his father, was multilingual. He regularly attended British RAJ embassy schools with an exchange program in French, Dutch, Russian, Chinese, and German schools, acquiring several languages. Robert learned Chinese on the streets and King's English in the RAJ schools.

Enzmann spoke many languages including English, French and other Latin languages, Chinese, Afrikaans, Dutch, Arabic, German and other Germanic languages. He could also read many ancient and dead languages.

His RAJ teacher was in her eighties, and she had been educated in the British colonies by a lady in her eighties. Robert was taught reading, writing, composition, arithmetic (emphasizing mental computation), history, astronomy, and navigationally based geography.

Young Robert traveled from Peking to England eight times, five by the Trans-Siberian Railway. Bob was 8 in 1932, and his mother decided European life was too chaotic and she brought the family to the USA by way of a Japanese ship, The Mishima Maru, to Seattle, Washington, then by rail to Boston, then finally to her family at home in Bath, Maine.

Robert grew up with his father in Dedham, Massachusetts, where he graduated from high school in 1943, enrolled in Harvard, and enlisted in the U.S. Navy as an electrical engineer student.

He has four years of active combat duty in WWII, saw fourteen active combat battles, was shot down five times (reverse Ace) and had considerable radar experience.

Enzmann explains, "I have always held that the U.S. Armed Forces are the best schools in the world. That's true in both peace and wartime. It's the only place where a young man or woman can get hands-on training in any trade, profession, or system that interests him or her. It's the one place where a young person can learn about, work with, and eventually make use of the most advanced systems in the world."

Dr. Enzmann was a student and colleague of Goddard, Charles Lindberg, Oberth, Taylor, Teller, Ulam, von Braun, and others of the time.

Enzmann has achieved degrees in engineering, geology, and medicine. He spent four years on foot mapping and researching southwest Africa and the Kalahari, studying the Namib, Nama, Namaqua, and Skeleton Coasts. He spent some winters working in Greenland, from Thule to the Ice Cap, Eastern Greenland, and Labrador, for radar Gap Filler.

His geological field experience includes Africa, Greenland, Asia, and Sweden. He taught physics and math at BU, MIT, and South Africa. After the second war, he circumnavigated the globe in his yacht from Bath, ME, and researched several 'interesting' ports.

Dr. Enzmann is a member of the American Geophysical Union; AIAA; Geological Society of America; Fellow of the NY Academy of Sciences, Assoc. of American Physics Teachers, Founding member of N. E. Cryonics Society, American Institute of Aero and Astronautics, American Rocket Society, American Physics Society, the American Assoc. of Petroleum Geologists, the Geological Society of South Africa, the Swedish Geological Society, and the German Geological Society.

### POST WAR DEGREES OF DR. ROBERT DUNCAN-ENZMANN

| | |
|---|---|
| 1949 | BA; BSc, (geological sciences) Harvard University |
| 1950 | B.Sc. England Standard (mineralogy and geophysics) Honors. |
| 1953 | MSc (crystallography and structural geology), Witwatersrand University, So. Africa |
| 1954 | Gymnasium Certificate (in classics) Uppsala, Sweden |
| 1957 | Ph.D. (polycrystalline solids and diffusion phenomena) Research at Royal University, Uppsala, Sweden Royal Grant with coursework National Science Foundation scholarship to Massachusetts Institute of Technology. |
| 1980 | Ph.D./M.D. Cuidad, Juarez, Mexico,. |

Several certificates from Navy Classes, USN electronic service schools (associates equiv.) Also, Experience in National Guard Infantry and Field.

## AMAZING DEVELOPMENTS

Dr. Robert Duncan-Enzmann made a major contribution to rocketry and American National Defense in 1959-1960 by inventing a technique which is never mentioned or written about in any journal, science magazine, or public media since its release in Missiles and Space magazine. The countdown system he developed for launches is now used around the world. It was fundamental in missile defense.

Dr. Enzmann with his engineer Edwin Pangman also invented a device called a Gyrane.

It is possible to control-change-direct the altitude (the way a spacecraft points) and even scan-and-track with it, cause it to rotate or stop its relation in any of three planes, or accelerate or decelerate in its inertial frame without either the use of gyroscopic fly wheels, expenditure of reaction, or any other mass.

This can be done because energy and momentum, both ultimately governed by Newtonian action-reaction, can be transformed one into the other.

For example: momentum of falling water spins a turbine wheel. Magnetically, the wheel's momentum is transformed into energy. The energy is propagated by direct or alternating current (occasionally as EM waves?) in processes excellently described, but even today, not really understood. At a switch, energy is easily transformed back into momentum by turning on an electric fan.

This is accomplished by the Gyrane. It is used in concert with the Athodyde faster-than-light engine, another Enzmann design.

That the Gyrane is possible is based on the fact that photon energy (e=hμ(1-d/D) and momentum (P=mv) differ. Energy is not conserved.

Gyranes operate outside time – at least time that can be measured by material clocks or are physiologically-knowable. Athodydes are curious machines, one of the few devices possible in this universe that can operate in two space-time frames concurrently. They function in real Earth time and in Ship's time.

The mighty interstellar engines called Lance Drives and their power plants are things of the real universe. As time slows down their thrust weakens even as output of the power plants that activate them dwindle. When ship's time runs at half of Earth's time, two lances must be ganged to equal the power of one Lance in real time.

As the velocity of starships in the æther approaches that of light, time runs slowly. When a minute passes as though it were a second, the output of reactors and engines drops, slowing down such that the output of a minute equals the output of a second of normal time.

Ultimately there is only one force: reaction to action. All forces are modulations of action and reaction. Descartes stated that all actions can be described mechanically, because they are mechanical.

### WHAT'S NEXT?

Enzmann experienced horse and buggy, millstone-ground grain, the great Siberian Railway trains, steamers, airplanes, microwave ovens, cell phones, computers, Moon landings, and beam defenses.

Enzmann has many published papers, including his contributions to three Planetology and Space Mission Planning conferences hosted by the New York Academy of Sciences, which he chaired.

The next step in Enzmann's mission plan is a Martian colony, then interstellar travel on the Echolance and Torch ships of his design. His Mission Plans are in the Enzmann Archive.

### DR. ROBERT DUNCAN-ENZMANN QUOTES

"Today we babble of nuclear wars – the reality is that beam weapons will, in a moment be turned into drives for manned interstellar ships."

"A crucial requirement of ameliorating global problems is the projection of new positive images of desirable, attainable futures."

"Perhaps all noxious industries will be moved from the Earth to sites like Mercury, leaving Earthlings in a park."

"The overall goal of all Space Mission Planning is to work toward maximum economic benefit, environmental enhancement, and improved health for all peoples."

"We stand today upon the doorsill of manned interstellar flight. It will happen swiftly."

"The capacities for invention, hard work, precision, and the acquisition and love of knowledge are universal."

"It is said that knowledge is power. That is not really true. Knowledge is potential power – it has to be applied. We now have sufficient energy available to reach for the stars."

"Starships are elements of a transportation system. We, humanity altogether, are moving relentlessly in that direction."

"A journey to fascinating stellar destinations, today flames as attainable aspirations fueled by the development of increasingly powerful propulsive systems."

"Why should we go? Because we must! A cornucopia for all mankind lies out there."

"So, go! Find within yourself the right way! Some of our works – the best we could accomplish – may help you."

**The Foundation for Research of the Enzmann Archive is passionate about sharing Dr. Enzmann's life's work. Help us preserve and publish the knowledge he has left this generation to share. Future generations will thank you.**

Donate to FREA and be part of the rekindling of passion for space.

Visit the Enzmann Archive Website. Check out the gallery.


**#1 New Release, #1 Bestselling Author.**
Introducing Enzmann's most elegant starship. The Echolance is the pinnacle of engineering, a giant step up from chemical rockets. A Starship designed for interstellar travel.

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# THE KING UNVEILS THE ASTRA CARTA SEAL AT A SPACE SUSTAINABILITY RECEPTION AT BUCKINGHAM PALACE

**To mark the launch of the Sustainable Markets Initiative's Astra Carta framework, The King has unveiled the Astra Carta seal, designed by Sir Jony Ive, in front of astronauts, business leaders, environmentalists and scientists during a Space Sustainability Event at Buckingham Palace.**

In 2022, The King (as The Prince of Wales) announced an ambition for his Sustainable Markets Initiative to create an 'Astra Carta' to act as a framework to inspire sustainability across the space industry.

The event was preceded by a Space Sustainability Symposium at the Royal Society, hosted by the Minister of State for Science, Innovation and Technology, George Freeman. During the Reception at Buckingham Palace, The King met guests including astronauts Major Tim Peake; Dr Meganne Christian; Rosemary Coogan; John McFall, a former GB paralympian; and astrophysicist Sir Brian May. Ahead of the unveiling, Colonel Chris Hadfield, former astronaut and Commander of the International Space Station, addressed guests in the room.

For more than five decades, The King has championed action for a sustainable future. His Majesty believes that everyone has a role to play in tackling even the most complex sustainability challenges facing our world. From Heads of State to young people, and from chief executives to local community projects, his unique ability to bring people together has proved a powerful way to find solutions and inspire people and organisations at all levels and all around the world.

### THE ASTRA CARTA

Recognising the growing role of the private sector in space activity and exploration, the Astra Carta offers an ambitious roadmap for the private sector to lead the acceleration of sustainable practices across global space-related industries. It also recognises the unique role that space can play in creating a more sustainable future on Earth and the need for the stakeholders to consider environmental and sustainable impacts beyond our planet. Its ambitions encourage a focus on placing sustainability at the centre of space activity.

Read more about the Astra Carta on Page 20, where Richie Enzmann also shares his thoughts on this important framework document for the future of space exploration.

# THE ENZMANN ECHOLANCE

# STARSHIP TO THE GALAXY

Dr. Robert Duncan-Enzmann and J. R. Snyder (written in the 1980s)

**The Echolance is a device designed in the late 1940s that could have been built in the 1960s. It was somewhat more complex than the Orion nuclear pulse rockets but would have been more efficient and probably cheaper. It could be built today, and manned starships using Echolance drives could be launched toward the nearest stellar neighbors of the Sun within a decade, before the year 2000.**

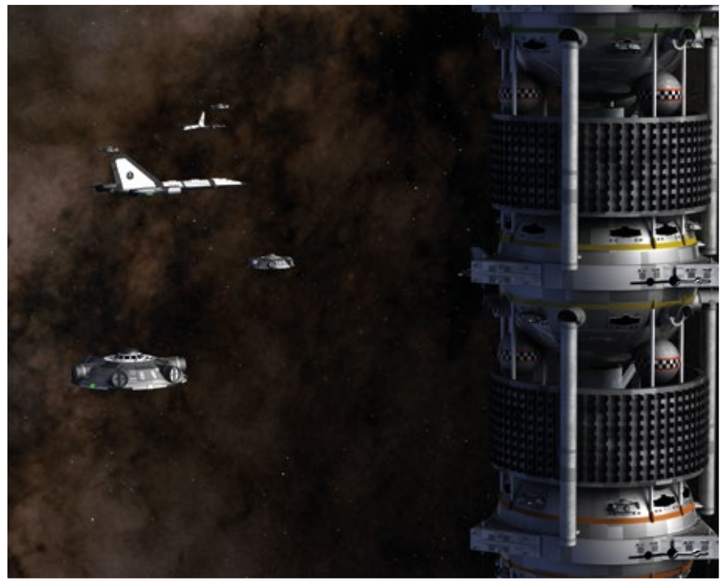
The Echolance propulsion system resolves the crucial reaction-mass problem, thereby lessening other problems of starflight. A rocket functions with maximum efficiency when its exhaust velocity exactly equals its forward velocity. At relativistic speed, lance drives can expel particles rearward. In doing so, they gain a forward component of reaction energy and the relativistic mass of the beam. Ideally, the beam would be left motionless in space with a trivial rest mass, while the ship would gain both the forward impetus of its forward reaction against its beam and the inertial mass of the beam.

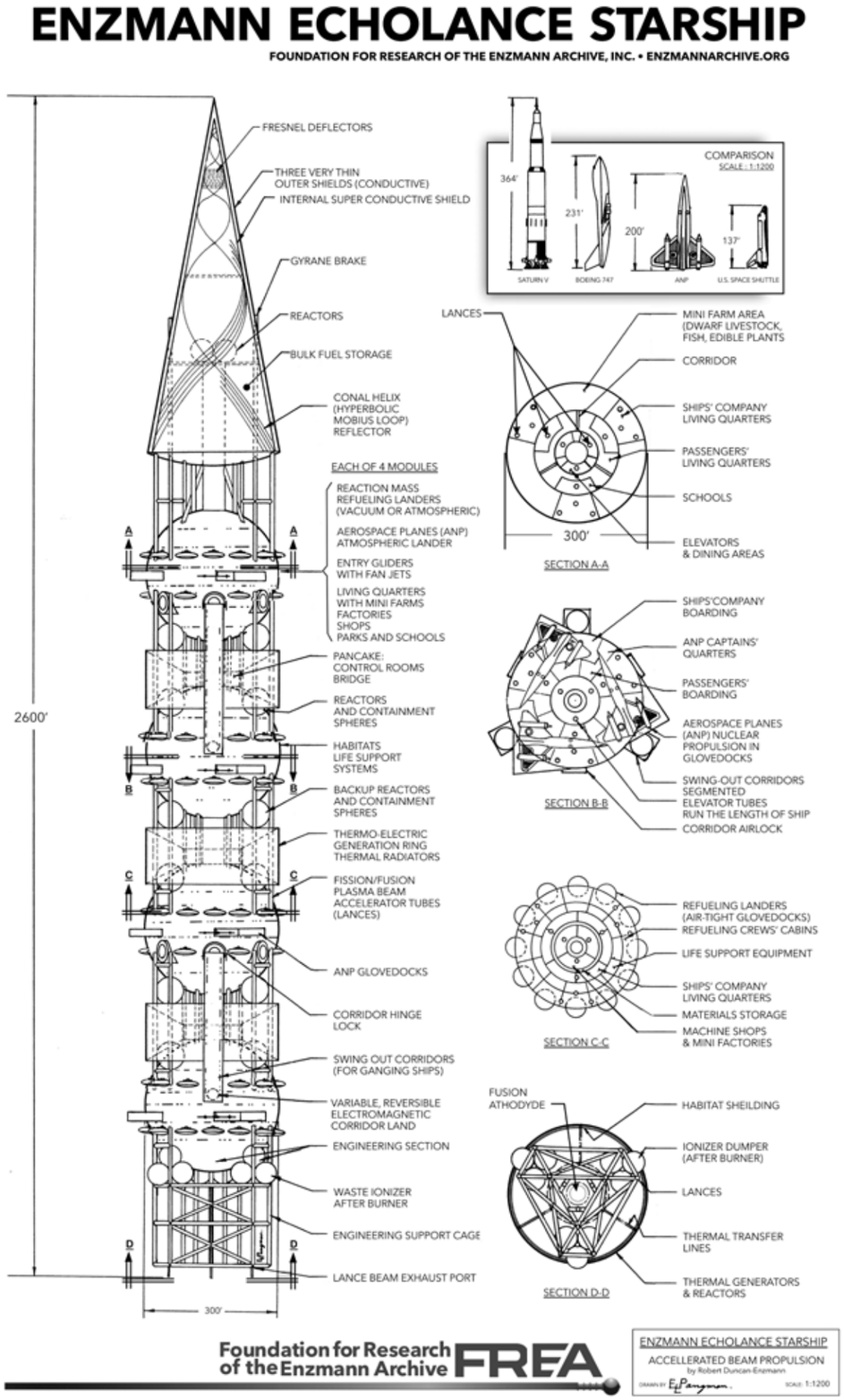
If chemical rockets are comparable with paddled umiaks, then Pulse ships and Torch ships are like galleons that sail downwind. Echolances resemble swift sharp-prowed clipper ships that tack onto the wind. The structural elegance of the Echolance is made possible in large measure by significantly reduced requirements of reaction mass and consequently fuel mass.

Not to be minimized is the importance of the transition in interstellar propulsive technology from the nuclear pulse ship's explosion of bomblets to the torch ship's continuous, controlled fission-fusion reaction. Yet this transition is dwarfed by the quantum jump to the Echolance particle beam. So fuel-efficient is the Echolance design that the gigantic snowball is replaced by reactors unobtrusively fixed to the ship's frame.

Designs of the starships driven by energetic particle beams date back to the writer's weapon research in the late 1940s and early 1950s. Not only can a particle beam ejected from a long slender lance be used as a weapon, but it can also be adapted to propel ships into the vast universe. Particles of extremely low masses at rest can be accelerated in beams to near-light velocities at which their masses increase. It is perceived that such beams are ideally suited to serve as reaction masses for rocket propulsion. The amount of mass that an interstellar rocket would need to carry for injection into a beam is minuscule compared to the awesome momentum imparted to the beam. The hot blue plasma of the beam would react against the mass of the stainless-steel rocket, impelling the rocket forward at ever-increasing velocities. As the ship finally approached the speed of light, such eerie relativistic effects as the slowing of the bodily processes of aging would be experienced by the voyagers.

What a pity that beams are not applied to propulsion rather than being viewed as potential weapons!






## THE STARSHIP DESIGN

The Echolance consists of a long framework that cradles four spherical hulls shielded by a sharply pointed cone. The framework also supports a number of reactors. The cone may be docked into a sphere filled with fuel for deep missions to distant regions. For short trips at moderate velocities, no sphere is needed.

Qualifications of a starship: it can sustain crew and passengers and reach a destination at least as favorable as the Earth's moon; it can reproduce itself. A starship is not a one-way mission.

The Echolance ship's mass is 20-50 thousand tons. It carries 10 nuclear reactors, each 1000 MW. Echolances are smaller and heavier than torch ships, faster, tougher, and more maneuverable. Echolance hulls are 27 layers between you and space.

The ship has five spherical sections, three major spheres on an Echolance, between each, an ANP deck for nuclear propulsion aircraft with 3-5 on each deck, 9 – 15 total.

Flight decks with ANP craft that can fly in space or through an atmosphere, in glove docks to minimize air loss, can carry heavy cargo, 100 refueling crafts, probes, hundreds of downy darts.

The ship's quarters are in six spheres. Each can support an entire ship's company in an emergency, providing refuge. All cabins and halls are soundproofed for quietness.

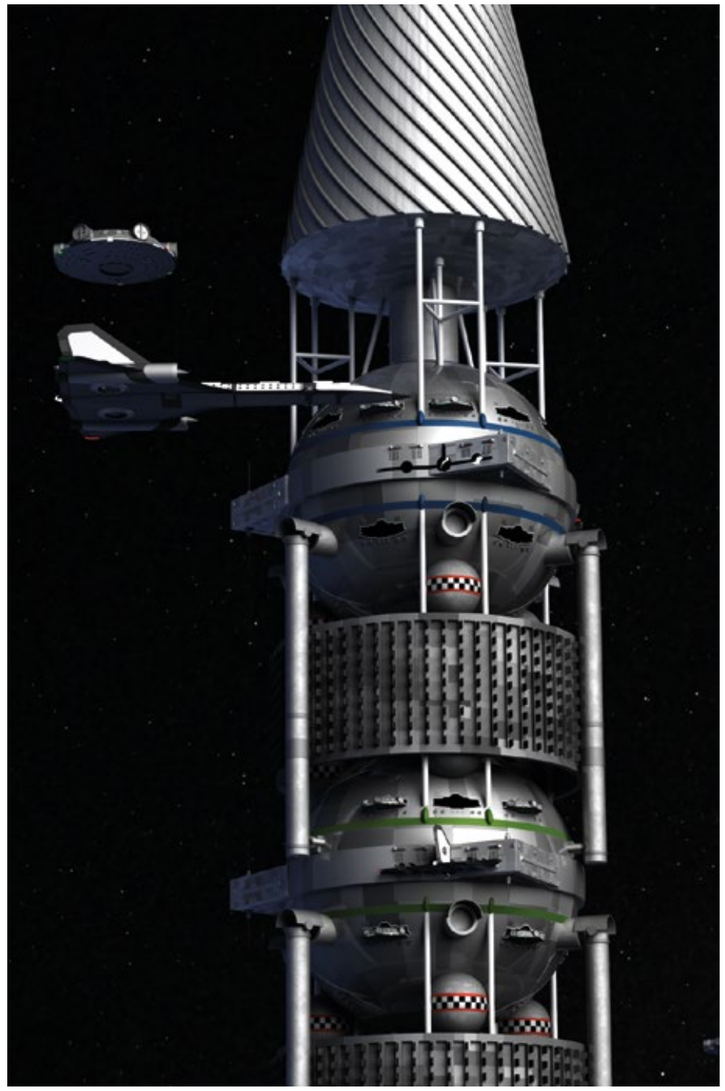
There are rings of quarters that rotate, and counter rotate for sleep gravity. There are single and family-size quarters. One of the six sections houses all aboard. There are 32 houses per floor, they have sort of a yard around each where things can be raised. There are eight stories in 100' spheres with two-story houses that are sort of round and are soundproofed. Private sleeping quarters are small and comfortable. Each has a locker with a spacesuit, a TV, is air-tight, and can open to other sleeping quarters.

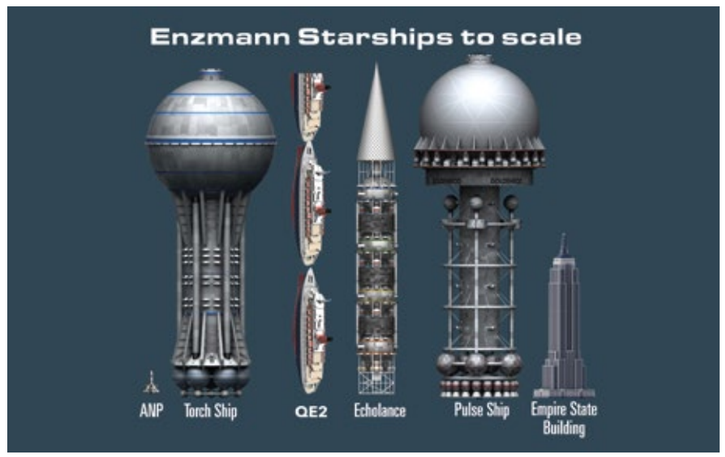
## ECONOMY AND ENTERPRISE

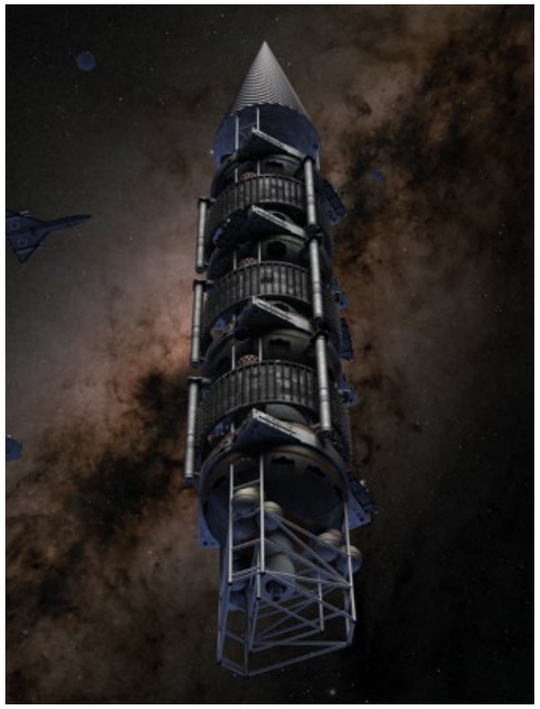
Every Echolance is equipped with laundries, farms, mini livestock, mini-factories, and markets. They use the gold standard for exchange. There is private enterprise like music, entertainment, beauty salons, games, and art, yet there is free for all foodservice – a sort of porridge that provides all essential nutrients is provided for all with a metal bowl and spoon on a chain. Steaks and other foods may be purchased.

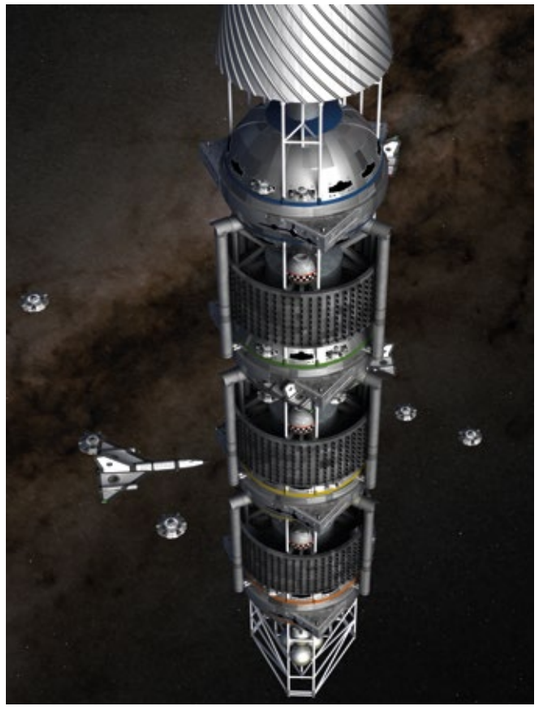
## THE JOURNEY

An Echolance carries five to ten tons of air that must be cleaned and preserved. Section doors are air and watertight, closed, and









bolted down at all times. You must pass through a series of three or four to go from one section to another to standardize the pressure of air and water. Most precious is air, if lost, it can't be replaced.

An Echolance starship carries a dead weight of supplies for 100 years for 100 people in case of system failure. It contains regenerative ecological systems – plants of 100-200 square feet of leaves soak up $CO_2$ and give enough oxygen for one person. Living quarters are well lit, and air circulates and renews all the time. Garden decks grow short stem wheat, barley, radishes, turnips, mint, potatoes, dwarf fruits, herbs, all planted in vermiculite.

For an Interstellar transit, at start-up an Echolance will launch from the departure station L4 or L5 and be taken toward the Sun by tug-ships that fling the Lance fleet at the sun. Thermal tanks strapped on, take over and plunge the Echolance to the edge of the Sun through the Cathedral of Flame where they gain 27G. To counter heavy acceleration each person could be suspended in a magnetized capsule.

Acceleration then starts at Mercury's orbit to speeds up to 10,000 miles per second. This Oberth Maneuver propels the fleet, shooting it out of the solar system's disk. Then the nuclear pulse stage starts and brings the fleet to 20,000 miles per second. The pulse engines are cut and the Lance drives cut in. The Echolance operates by an Athodyd engine (flaming egg-shaped) on the outside of the ship.

The photon scoop has no weight, but it scoops hydrogen from outside into the ship's athodyd and burns 1H atom per cubic centimeter of interstellar space. The Echolance then increases speeds to 186,000 miles per second – close to the speed of light (SOL) A factor of $10^{27}$ (billion billion billion) grams of hydrogen is scooped into the athodyd engine, compressed, and burned, providing energy. Eerie, burning outside, not inside the time the ship is in, but stops dead when burned and impetus is given causing the echo. Fuel is always outside the ship.

Nearing these velocities produces a Starbow – a morning glory glow of colors of stars in front of the Echolance, from indigo to dull red – a flower-like shape with magnetic tendrils; is also a shield for ship, from particles coming in with tremendous speed. Scooped hydrogen looks like a stem of a flower with greens and blues.

An Echolance can communicate at many times light's velocity. The Echolance, starting from Earth orbit, will set up an interstellar communication system. Echolances can travel in groups, each having three units, each independent, creating a three-fold redundancy, times as many ships.

The bridge of the Echolance is contained in a transparent sphere with a cone (shield) above it, providing a full 360 degrees view of the stars. Visitors are allowed in a gallery on the bridge, but on the bridge deck, visitors are restricted, for only the operational crew is allowed on deck.

Flight simulators are used to teach ships' operations to kids. They learn to make their own spacesuits. Training takes ten to fifteen years. Gracile suites, comfortable and expensive, are form-fitted and layered. The gracile suit recycles clear fluids, nutritious solids, and fresh air to breathe. The suit's helmet expands or can blow a bubble fifteen feet in diameter around you, and you can climb into the bubble and get out of the suit.

Protection from the perils of space travel is supplied by various kinds of sophisticated shields. While displaying design improvements, the compartmentalized modules resemble their earlier counterparts in the Pulse ship and the Torch ship. An Echolance carrying four habitat spheres, each about 300 feet in diameter, would comfortably accommodate several hundred crew members and 5,000 passengers. If necessary, the basic needs of as many as 25,000 occupants could be met.

**The writer has not explained much concerning technology. That comes when we're really together on this effort. What is written spells out what absolutely can be done.**



# THE EUROPA CLIPPER MISSION

# A JOURNEY HOME IN OUTER SPACE

Richie Enzmann, Space Planet

**At the end of last year perhaps one of the most interesting recent space missions to date has begun. The mission's primary target, Europa, is one of Jupiter's four largest moons. There is strong evidence that Europa has a saltwater ocean beneath its icy surface that may be one of the best places to look for environments where life could exist beyond Earth. Scientists estimate it could be around 40 to 100 miles (60 to 150 kilometers) deep — large enough to contain more than twice as much water as all Earth's oceans combined. Europa's diameter is about 90% that of Earth's Moon, with an equatorial diameter of 1,940 miles (3,122 kilometers).**

The main body of NASA's Europa Clipper spacecraft was delivered to the agency's Jet Propulsion Laboratory in Southern California, where engineers and technicians finished assembling the craft by hand before testing it (Courtesy of NASA/JPL-Caltech/Johns Hopkins APL/Ed Whitman)

NASA will invest a total of approximately $5.2 billion in the full life of the mission, which spans about two decades, starting in 2015 and going out to 2034 — the end of Europa Clipper's prime mission.

## THE MISSION

NASA launched the spacecraft for the Europa Clipper in October 2024 from the agency's Kennedy Space Center in Florida on a journey to the Jupiter system, where it will make multiple flybys of the ocean moon Europa. With gravity assists from Mars and Earth, the journey to Jupiter will take 5 1/2 years. The spacecraft's prime mission, which will also include flybys of the Jovian moons Ganymede and Callisto, will be a little over four years, from 2030 to 2034.

Europa Clipper Explores an Icy Ocean World – Artist's Concept (Courtesy of NASA/JPL-Caltech)


Please check out our website on:
**www.spaceplanet.org**