

## Thomas Lee Elifritz – Biography

Syntech Living Systems was my first space commercialization shop, set up in anticipation of future low cost NASA space shuttle flights, and in order to commercialize my robotically controlled, large scale, high intensity, hydroponic plant growing products and systems used for life support systems and human space flight. This facility included metal welding and fabrication facilities, plastics injection molding equipment, concrete form manufacturing, life sciences laboratories, a vertical multilevel space flight test facility, a desert island research station and private aircraft operations, along with a working farm.



With Syntech, I was responsible for furthering my education at the University of Wisconsin – Madison, development, construction and operation of various production facilities, infrastructure assets and real estate, livestock and agricultural operations, logistical scheduling for materials, parts and consumable deliveries, product design, development, test, manufacturing and sales, and advanced research into modern space launch and space flight technologies and terrestrial habitat development and operations.

- Performed Basic Life Science Experiments
- Designed Products for Scientific and Technical Markets
- Implemented Machine Shop and Manufacturing Capabilities
- Developed and Maintained Life Sciences Laboratories and Facilities



After the Space Shuttle Challenger disaster on January 28, 1986, this initial era of many tentative space commercialization efforts collapsed, and this preliminary effort was terminated and the assets sold off, with the exception of the island known as Lansing Cay in the Exuma Cays in the Bahamas out islands.

After shutting down my first space commercialization effort in Windsor, Wisconsin, I took a software engineering position at a local telecommunications company, where I promised them a full year effort to learn the FORTH programming language at the FORTH Inc. level, to upgrade their EPROM burning capabilities, close their compile-test-recompile cycle using modern floppy and hard disk drives, SCSI bus controllers and DMA controlled single board computers, and to institute a fully self recompiling code archival system and full cross compiling capabilities across multiple CPUs - including Motorola and Intel 32 bit CPUs, and Zilog 16 bit microcontrollers. Once this basic state of technical competence was achieved, I then instituted a new software engineering training program to preserve this corporate knowledge and skill. From a scientific perspective, the extremely compact and linear self recompiling code that I developed at Amtelco was sufficiently competent that I was able to almost trivially cross compile install it onto almost every available 8 and 16 bit microcontroller and microcomputer of the era, obtained by hand designing and writing my own assemblers, including Intel 16-bit x86 and 32-bit 386 IA-32, and occasionally hand assembling the code to full assemble, edit and recompile capability.



- Developed and Maintained Self Recompiling polyFORTH II Nucleus
- Maintained “EVE” – The World's Largest polyFORTH II Application
- Implemented Training Programs for Programmers and Engineer
- Assured Cross Target Compiler Capability Across Multiple CPUs

I left Amtelco to live in the Bahamas full time, since their corporate management showed little or no interest in dramatically expanding their product line and business into developing 32 bit bus controlled motherboards, modern slot mounted graphics cards, compact digital telecommunications switches, and serial bus communications protocols (proto-LANs), even though they had all of the capabilities to do so and already had workable prototypes and products in each and every one of these commercial markets.

During my previous telecommunications experience, I became intimately familiar with semiconductor physics and solid state device fabrication technologies, and during this era a paradigm shift occurred in condensed matter physics, with the discovery of high temperature superconductivity in the cuprates. During the summer of 1988 it also became painfully obvious that the increasing atmospheric carbon dioxide concentrations were well on their way to causing irreversible changes to planet Earth's climate.

With these two thoughts in mind, I decided to relocate permanently to my island in the Bahamas and seek employment at a local world renowned marine research center – the Caribbean Marine Research Center (CMRC), where the managers of the center had procured multi-year federal line item funding under the National Undersea Research Program (NURP) within the National Oceanic and Atmospheric Administration (NOAA). The program was funded at roughly \$18 Million dollars per year for the six research centers, or approximately \$3 Million dollars per year for the CMRC alone, bringing together a diverse set of geophysicists, planetary geologists, marine biologists, aqua-culturalists and advanced equipment and habitat operators for collaborative personal projects out in the field at the sea, air and land interface along the continental shelf drop-off of the Exuma sound and the Great Bahama banks.



During this period I developed a PC card software PBX simulator for the moderately primitive radio telecommunications system. I adapted power MOSFET based voltage inverters to small solar panels and wind generator systems, for general home power and automated robotic hydroponic plant growing. I engaged in boatyard and diving maintenance, observed first hand operations of an underwater habitat, and submarine operations in the refurbishment, rebuilding and extended diving campaign of the Nekton Gamma – a two man, 1000 ft capable minisub, along with an aluminum catamaran tender, a research vessel, a hyperbaric chamber and a full dive shop and tank filling facility using submarine surplus bulk air supply tanks. The center also operated a precision analog and digital tide tidal gauge system, and included aircraft operations, and some collaboration with existing hydrogen and solar energy resources.

Everyone associated with or working at the research center was encouraged to engage in many unique collaborative discussions and projects, and my personal project was the new modern theories of high temperature superconductivity, quantum coherence and the BCS-BEC crossover, metal salt (sodium ammonia) solutions and hydrogen energy, which resulted in the publication of my bismuth iodide bonding hypothesis in 1994, and the almost immediate theoretical verification of the low level excited electronic states of the bismuth iodide molecule. Alumni of the center during this period are a who's who in planetary geophysics and geology, and also included a NASA teacher in space astronaut.

After the management of the research center was ousted in a hostile board takeover by heirs of the island's owner, I decided to move my primary research laboratory in the Bahamas to a small nearby island group called the West Pimlico Cays, and conducted my space habitation experiments there.

- Elifritz vs. Elifritz – Supreme Court Order, The Commonwealth of the Bahamas, 1997, #20,
- Argued a successful legal defense of Bahamian island ownership, resulting in a time sharing agreement with development restrictions.
- Elifritz vs. Elifritz – Civil Court Litigation, The State of Florida, Lansing Cay, Exuma Cays
- Prosecuted a successful legal effort for defendant’s discovery documents, resulting in the half Bahamian island ownership of Lansing Cay, the Exuma Cays, in the Bahamas.

After the management change at the research center I remained on for a time as a contractor, and then essentially underwent a multi-year period of political exile on much smaller nearby 1 acre desert island. I quickly constructed alternative solar and wind powered sustainable desert island homes and habitats, improvised solar stills for clean distilled water, large area rainwater collection and storage systems for potable water, hydroponic systems, composting toilets and implemented completely functional living systems for simple sailboat transportable, out island living, at very low cost and environmental impact.



After living seven years in the West Pimlico Cays, finally securing my assets there through two civil court cases, I returned my equipment and infrastructure back to my home at Lansing Cay, and then reconditioned and redesigned my home there, removing two out buildings, relining cisterns, building porches, the redesigning and rebuilding the dock, the boat yard, the boat ramp and several big dollies.



With the end of civil litigation in 2000, I was suddenly confronted with again being able to live on my beloved island in the Exuma Cays in the Bahamas, starting immediately. My political exile in the West Pimlicos had thus ended and I was encouraged to move my experimental life support laboratories back home again, by decree of the land board and local administrators, and with the consent of my partners, which I promptly accomplished. Resort development was finished at this point, and so I proceeded to dive into my commercial space port development and astronaut training in earnest now, with the eager anticipation of a future small commercial kerosene powered engine and launch vehicle, the Falcon 1. During this period which I considered to be astronaut training, my own personal research was focused on the development of space colonization and the implementation of commercial space transportation launch vehicles and engines – anticipating a 100 klb, kerosene engine and launch vehicle from SpaceX.



- Machine Shop, Dock and Boatyard Construction, Hurricane Preparedness
- Space Port, Resort, Astronaut Training and Launch Facilities Development

After two particularly bad hurricane seasons in the Bahamas and Florida (2004, 2005), and after accomplishing almost everything I could in the Bahamas, in the form of endurance training and logistical infrastructure development and life support provisioning, I left the Bahamas permanently to return to Wisconsin specifically to engage in end of life familial home health care, and to pursue space commercialization on a much more aggressive basis, now secure with the knowledge that the industry had sufficient leadership, insight and investment to succeed in at least the basic launch vehicle sector.

#### Space Commercialization – The Tsiolkovsky Group – The Archimedes Group – Launch LLC

During the first four years of this period, 2006-2009, the 'Constellation' years, I was engaged in 80 hour a week terminal parental patient care at home. On every day off I attended and directed my working group meetings, where the sole purpose was to develop a suitable space launch vehicle design capable of countering and salvaging the Ares designs of Constellation, an obviously technically flawed and fiscally unexecutable space development architecture designed by Michael Griffin and falsely validated by his ESAS study. We were also vitally concerned that suitable life support technology and mission scenarios were developed, for the coming era of commercial space flight using the Falcon 9 launch vehicles when they began flying. This period involved the use of the Orbiter Space Flight Simulator to verify our basic engine arrangements and vehicle designs, and resulted in the Delta V reusable launch vehicle proposal for the NASA Commercial Orbital Transportation Service solicitation (JSC-COTS-2) and the NASA Commercial Crew solicitation (JSC-CCDev-1), along with another proposal for the new Wisconsin Institute of Discovery (WID) facility at the University of Wisconsin in Madison, Wisconsin.

The period from 2010 to the present was marked by the end of my parental home health care duties, the cancellation of the NASA Constellation program and the Ares rockets by a new president and his new administration, and the beginning of my nearly full time involvement again in advanced space research. However the cancellation of Constellation was immediately reversed by congress, and its continuation was enforced by congressional decree and legislated into law by both authorization and appropriations.

With this result in mind, and the successful flight of the first Falcon 9 launch vehicle by SpaceX, my efforts quickly progressed into a pace of technical innovation and sequential publications that surprised even myself, involving launch vehicle reusability, space habitat and life support system design, asteroid retrieval and mining, lunar base development, astrobiology and planetary protection, More recently this included the dramatic developments in the area of condensed matter physics, such as high temperature superconductivity, topological insulators and superconductors, thermoelectricity and thermomagnetism, nanotechnology and picotechnology including the validation of my bismuth iodide bonding hypothesis. I also recently proposed my Delta 9 reusable launch vehicle design for a United States Air Force RFI.

- Company Founder and Chief Executive Officer
- Performed Multidisciplinary Research in the Natural Sciences
- Engaged in Systems Engineering, Research and Development Projects
- Published Seminal Reports for Emerging Commercial Space Flight Industry

My future direction at this point in my career is to continue the modern theoretical and experimental investigations into strongly correlated electron systems, lightweight, affordable earth to low earth orbit launch vehicle architectures, closed ecological life support systems, and super insulated, low carbon emission, earth sheltered homes and habitats for earth and space. I am particularly interested in my continuation of the communication, presentation, encouragement, promotion and persuasion of these ideas to both the powers that be in government and the rank and file of the space advocacy community.

### **Rocket Science and Space Architecture**

Specifically an immediate goal is the conversion of the Space Launch System (SLS) and Orion capsule (MPCV) programs into new reusable and sustainable NASA deep space habitation programs that do not involve destructively disposing of the expensive and irreplaceable large volume, pressurized, insulated cryogenic hydrogen and oxygen tankage, and the Space Shuttle Main Engines (SSMEs), four at a time, into the atmosphere and ocean, immediately after almost, but not quite, reaching low Earth orbit. This problem is what I consider to be the most easily solved outstanding problem confronting NASA today. With a new president and congress expected very soon, there is a limited amount of time left for the transition to value oriented programs such as a comprehensive hazardous asteroid survey, orbital debris mitigation strategies, reusable heavy lift launch vehicles, core and upper stage space rated cryogenic insulation, advanced thermocoolers and thermoelectrics, thin film deployable sun shields and reflectors, internally deployable inflatable habitats and zero gravity hydroponic plant growing systems. In order to enable these technology advancements, the Space Launch System and Orion capsule programs must be modified to accommodate liquid reusable boosters and core and upper stage to high orbit flights, and orbital retrofit capabilities. These are not optional enhancements, but are critical enabling technologies.

With the establishment of at least two reusable commercial launch services providers, and with the new paradigm of large two stage to orbit reusable launch vehicles, I intend to finish my work in this field with two final essays – *The Archimedes Space Architecture* and *Tsiolkovsky Reusable Launch Vehicles*.

### **Theoretical and Experimental Condensed Matter Physics**

Having reviewed recent progress in condensed matter physics, I have ascertained the crystallographic facet dependence of the electronic states of the bismuth lattice and its relation to my original bismuth iodide hypothesis. This renewed my interest in geometric and topological aspects of superconductivity.

### **Quantum Cosmology and the Origin of Life**

I have discovered that many theoretical aspects of quantum gravity and quantum cosmology are easily modeled and simulated by liquid helium immersed, rotating and torqued, topological superconductors and magnetic insulator heterostructures, and also laser trapped cold atom boson-fermion experiments. *The Cosmic Evolution of Autobiogenesis* describes how life is an inevitable result within these systems.

### **Position Statement**

The serious human political neglect of obvious existential environmental threats to life on planet Earth over the last 35 years has left the environment so seriously degraded that it can no longer support the billions of people who depend upon their local ecosystems and the global biosphere for their livings. Unless clear, immediate and decisive action is taken on all three of these interrelated scientific fronts – space development and colonization, the quantum behavior of condensed matter physics systems, and the invalidation of religion as a useful social concept – the global system of commerce is unsustainable.