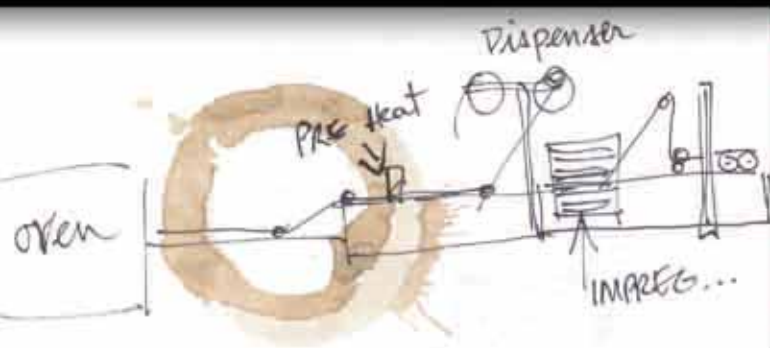


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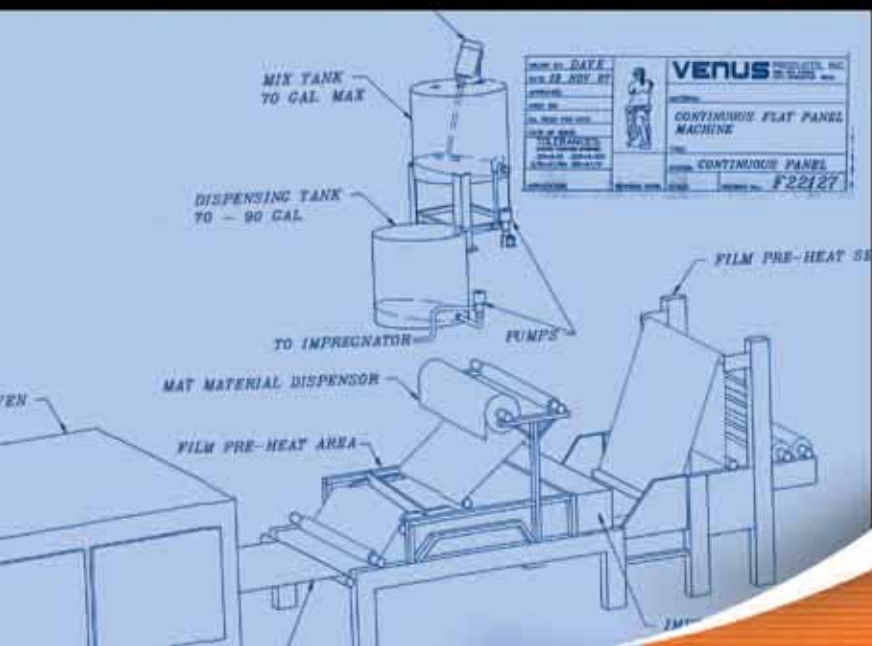
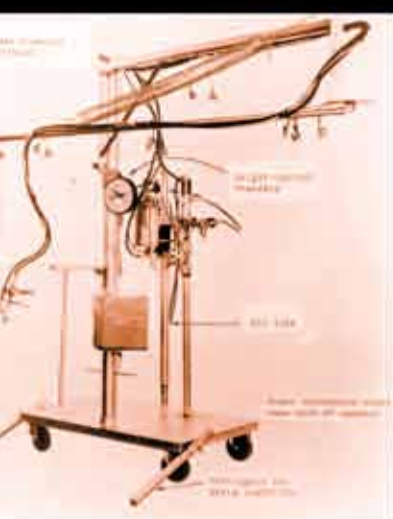
## Venus Founder Frank Ives

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# Inventing Frank Ives Venus Founder & Equipment Guru

By Andrew Rusnak

On the phone, as I speak to him for the first time, he seems somewhat inscrutable behind 3,000 miles of cable and two week's worth of charitable sympathies offered me by several of his closest associates. Frank Ives sounds energetic, tired, focused, and hampered. Distance has its advantages, sometimes its rewards, rarely its consequences. Or, the opposite is true.

To say that in person, several weeks later, an exposed Ives is even more energetic, tired, focused, and hampered is sticking my neck out halfway. Tired, hampered, and sympathy are the (unavoidable for him, avoidable for me) results of liver cancer and chemotherapy, and how can one accurately and tastefully write about a weighty industry figure with miles of venturous history, loved and highly respected by all who worked for him, who now suffers from liver cancer and chemotherapy—a delicate, violent turn of life everyone wants to bury?

But to also say the 77-year old Ives spent his life pursuing opposites, up close or far away, and different and better ways of doing things—punching through the status quo—is risk free. He sits erect, squeezed into a small chair-desk in front of me. Energy seethes beneath the rigors of chemo in a man who took more risks inventing composites equipment than I will with this

article because it seems here there should be less room for failure, more opportunity to “get it right.”

Then again, just as there can be no pretense without humility, illness without health, time without clocks and invention without rupture, the opposite could be true... *that place in the body, the liver, a crucial organ, a chemical factory, cleaning, refining, extracting poisons from the blood...*

Early in the summer of 1982, on a warm day at Sun Runner Marine in Spokane, WA, twenty one-year old Jeff Austad awkwardly waved a squeegee across the hull of a 24-foot, Sun Runner sport cruiser. As he and two inexperienced coworkers struggled to remove excess resin and trapped air, Austad noticed a small group of men off to the side. Dressed more for boardroom deal mongering than a dusty fab shop, the men watched the trio while apparently waiting for someone. Austad returned to task only to be surprised moments later when one of the men suddenly appeared next to him. “Hold on, you aren’t doing that right,” the man ordered, at once obtrusive and



Winder Installation for insulated pipe, North Sloop, Alaska.



Original spray molder two-pot system, early 1960s.



Venus H.I.S. automatic Chopper Gun mounted on A.M.F. 5 axis, tape controlled Versatran arm.



Venus Implant Show—Late 1970s. Frank Ives on Recip. Platform.



Machine for Bonding Highway Buttons on I-5 in Seattle during the 1960s.

helpful. He grabbed Austad's squeegee and immediately Picasso-ed sweeping, artful strokes.

Austad and his crew were slightly taken aback. Demonstrations of this sort were rare, not only with boat builders, but throughout the boot camp milieu of 80s manufacturing. "He not only showed us the correct method, but Frank Ives explained in detail the hows and why of what we were doing," Austad recalls.

For the next seven years, Austad bounced around various boat yards on the West Coast, studying business, art, and advertising at night, eventually taking a degree from Eastern Washington University in 1984. He never forgot that little scene with Ives at Sun Runner. It flashed foremost in his mind in 1989 when he hired on at Venus in test services and research and development. After a month, he moved into sales and marketing, been there

ever since, and is now VP in charge of distribution and corporate accounts for Magnum-Venus Products (MVP).

*"In normal growth, every minute of your life, cells throughout the body die and are replaced by new, healthy ones. Cancer begins, for reasons not fully understood, when cells grow and divide abnormally. A cluster of abnormal cells forms a tumor which grows and spreads."*

— WebMD (<http://content.health.msn.com>.)

*\*All italicized quotes on cancer throughout*

There's a trace of urgency in Technical Editor Bob Lacovara's message when I listen to my voicemail one day in late March.

Bob Read, thirty-year associate of Ives, had given Lacovara an update on Ives' health, and both agree it's time for a story. From the moment I receive the phone message and place a call to Read the story becomes urgent, a battle. One side of passion says slow down, get the story right. Another desire wants it done quickly so Frank will see it. However, it is weeks before I make contact with Ives, messages go unanswered and I'm told he's losing strength and might not be up for an interview. I

later determine the reluctance on Ives' part had more to do with modesty. Regardless, time grabs me by the collar. Before Read drops me off after the interview, he hints around. "How long does it usually take to write a story?" he asks. There's no objective answer, so I fashion what I hope is a promising and accurate response.

*"There are two types of liver cancer, hepatocellular carcinoma, sometimes referred to as HCC or hepatoma, and cholangiocarcinoma."*

Cold medical data that irritates, pushes, annoys; a taboo in the spotlight. I want them to release their hold and vanish. They're not what this story is about. During the interview, Ives is the strong one as a handful of those he nurtured through the professional ranks sit in a circle with their mentor and tell stories, slap backs. "Frank is the industry," says Mike Schreiner, now of Buchanan Automation, who worked at Venus in the early 60s. "He used to post a long, never ending list, from ceiling to floor, of projects on each of our office doors. Most of these tasks were risky and challenging." Ives has a content, almost smug look on his face. He's a puncher, plier, patient assembler of here-to-fore unimaginable concepts. I realize the interview, like a long lost Saturday night poker game, is an event in and of itself, not just a forum for me to gather information for a story. For as tired as he is, Ives commands the rhythm of the scene as reunion lore jumps to the middle of the circle, then gravitates over to form a protective aura (more like a force field) around his still tough and demanding façade. He nails words to the air. They carry the infinite echo of a pendulum on an old clock in an empty room. "Normal cells do not become malignant suddenly. It can take many years before a cell growing out of control produces a tumor." Cancer, one more unproven concept for Ives to conquer before the marketing guys take over, maybe many years down the road, like MVP Veep Tim DeLucca's recollection of his first trade show. "They were standing in a long line just waiting to talk to Frank."

It was a curious boy, with quick, skillful hands and a charged imagination, that tied model balsa gliders to his black and white Columbia bike with 300 feet of kite string, peddled as fast as he could, and launched handfuls of playful ideas into the ripe, effervescent zephyrs of Selah in South Central Washington. During the 1930s, the Great Depression, a make-or-break chapter one in the story of the greatest generation, amusement was sought in simple accessible fragments, overlooked offal, mechanical schemes. Frank Ives scoured the orchards for old, white pine, apple boxes. He studied the pages of *Model Airplane News*, attended hobby classes at the local YMCA, and worked pine and balsa with a razor blade to shape 140 model planes and gliders—Mister Mulligan, a race plane that won the Cleveland air



show in the early 30s, Ryan's Spirit of St. Louis and Sport Trainer, and the GB Traveller, an unconventional biplane with the lower wing forward. Sometimes he cut the string loose, gliders caught thermals, disappeared, small diversions linked to a survivor's big dreams.

Ives' father John moved to Fresno, California with his wife Mary in 1923, tired of northern Michigan winters. During the temperate seasons, northern Michigan was known as the "iron range," a

picturesque stretch of peninsula loaded with iron ore—mined, loaded onto ships, and hauled down Lake Huron to Detroit to make automobiles. Employed as a Packard mechanic at a local dealership, and as a typewriter repairman, John Ives now labored in the solar-bathed agricultural community for Sun Maid raisins. His first and only son Frank was born in Fresno in 1924, a year before the family headed north to the Edenic Yakima Valley and the promise of steady employment for the senior Ives as a mechanic with a Ford dealer. Selah, a few apple boughs north of the city of Yakima, flourished with fruit trees, vegetables, cattle, and mint. Yakima, the gateway to the Cascade Mountains and the Yakima Valley, came to nourish a parts industry for small aircraft and, later, food packaging plants. John Ives eventually opened his own garage and enjoyed a healthy living until the Depression hit and Roosevelt closed the banks.

"My father had \$1500 in the bank that he used for operating the garage," Frank remembers. "The account was wiped out, leaving him to do miscellaneous repair work and odd jobs."

Early in 1940, John Ives heard of a job as a distillery engineer in Renton, six miles above Kent near the coast in eastern Washington. John and Mary took their three children (Frank had two sisters, Mary and Anna) to live there, where Frank graduated from high school in 1942, lettering as a tackle on the Renton Indians football team. By now, he had inherited his father's work ethic. John Ives eventually settled on long-term employment as a stevedore and Frank caddied at the community golf course for pocket change.

But it was back in Selah, in between his freshman and sophomore years while working a summer job thinning apples, that Frank Ives realized he suffered from an intense, nagging, and incurable proposition: the proposition of the better way. Always, the mind of a generation that learned ration stamps and rode B-17 Flying Fortresses and Sherman tanks out of the Depression. Always, the mind that tortured muscles, ligaments, and bones to victory in an era where simple tools like wrenches, screwdrivers, the jarring pistol

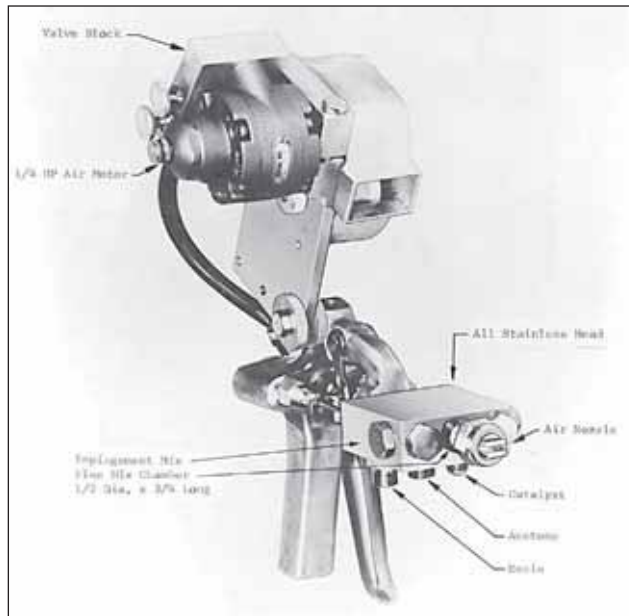
grip of a rivet gun and the helmsman's wheel of a lathe rubbed more natural in the palms of callused workers' hands than the delicate edge of a computer mouse. Always, the mind that sensed fortune in the noisy impoverished sight of brute machines that pushed, carried, lifted, and mixed, far from the quiet invisible ride of modern E-fortune. Always, this mind sought a better way, a continuous, life-easier way through a world gone steel girders, controlled combustible explosions, and spattered hot grease like sharp pins flying through the air.

This industrial flourish, from smoke stacks to garage gadgetry, the opposite of what came before and after, was Frank Ives' mind that day in the orchard when, at 14 years old, he struggled to balance a heavy ladder down a row of apple trees, delicately position it under a sturdy bough, and pick by hand those raging fruits clogging the cluster so the bunch could grow healthy. There has to be a better way, he thought. There has to be a mechanical, before-and-after solution to everything. More than half a century later, that part of his brain, like a finely calibrated micrometer taking measurements on his memory, he turns that menial adolescent moment with the ladder into, "I always knew, from very early on, that I wanted to be an engineer." Always.

I'm told—cab driver, hotel doorman, store clerk, warehouse worker—that it's an unusually beautiful April day in and around Seattle-Tacoma, where tourist T-shirts jokingly proclaim the annual Rain Festival from January 1st to December 31st. Or, the opposite is true. Of the many times I've been here, the weather has always been sunny and pleasant. I've stopped expecting rain. When I mention this, locals offer ingratiating smiles and tales of drenching, as they seek to protect the summer sun and freeways from annoying tourists who can't help but contemplate adding to burgeoning demographics.

Twenty minutes before the Ives interview, I sit at a picnic table in front of the main office of MVP's Kent, Washington facility. At ten O'clock I'm scheduled to meet John Schreiner who helped coordinate the interview. There's some question whether Frank can make it, coming off a particularly heavy round of chemo. I may have to find a ride to his home, three miles from here on a verdant hillside.

The grounds are immaculate, and look more like a lazy tour through a topiary garden. Flowering plum trees, tulips, rhododendrons, all planned, planted, and, at one time, maintained by Frank Ives and his wife Margaret. "I once saw Frank pulling weeds with the janitor," Schreiner puts in. The City of Kent now uses the facility as a standard for all businesses. Train tracks stretch hopelessly on an embankment behind the plant, and the American, Washington State, and Venus flags ruffle in quick rhythm from a verdant breeze released from the mountains, sounding like someone with big legs and heavy trousers striding by. An unusual, circular, concrete structure, resembling a giant mushroom, sits off in the corner. There



First H.I.S. chop gun, 1968-69.

is no sign of failure anywhere, no sign of diagnosis or infection. But Frank Ives will be the first to say that he suffered rampant failures, that no success ever comes except through failure. He understands the sum total of adding opposites. Even, as I found later, the large concrete mushroom which Ives sought but failed to engineer into a vertical automated parking lot for large metropolitan areas means something—a monument to risk surrounded by robust plum trees and buildings where some of the composites industry's best equipment is built.

In the summer of '42, Ives took a job in a Seattle shipyard—sheet metal and boilers on destroyers.

Manhood, close, tasted like sweat and acted out of sinewy impulse. After a month, he was summarily fired. At 17, he lied on his application, had to be 18 to work, to be a man, at least on paper. Days only passed until he weaseled his way onto a construction site as a water boy and siding helper. College started in September and he needed the money. But another objective tugged at his budding sense of responsibility, not to mention everywhere he looked he saw fleece-lined bomber jackets, chevrons, and senior officer salutes. When he did turn 18, after two quarters in the University of Washington's Mechanical Engineering program, Ives immediately joined the army. It was still the same world, April, 1943, grimy mechanical solutions to defeat the Third Reich and Japanese imperialists.

"I was one of the lucky guys," Ives says, although his face seems at once confident and heavy with uncertainty. "I went through basic training three times. In three years I was with 13 different outfits and always got out in the nick of time, so to speak."

As an ammo carrier for 90mm anti-aircraft guns, before shipping out to Africa where "Rommel pounded the hell" out of men Ives trained with, he was reordered to a 40mm anti-aircraft unit. In August of '43, following a couple more moves—infantry, another 90mm gun—he found himself with a second 40mm anti-aircraft crew bound for a beachhead in Salerno, part of Lt. General Mark Clark's 5th Army invasion force. The Germans counterattacked in southern Italy and fierce battles raged for days, but Ives saw it only on newsreels, one cameraman capturing in vivid detail the annihilation of a 40mm gun crew. Ives and four others had been transferred days before.

Ives' peripatetic military life continued through 1943: the STAR Unit in Compton, CA; engineering courses at Loyola Marymount; two surgeries at Sautell Hospital. By March of '44, Ives found himself hauling bales of hay and sacks of oats for 17,000 army mules at Camp Roberts in California. It wasn't until September that he shipped out of Boston to Liverpool and on to Cardiff where he worked the docks to aid British civilians. Later that year, he crossed the English Channel to LeHarve on a tramp steamer, the South African, Mail that was sunk by a mine the very next trip. Honorably discharged in March of '46, he returned to the University of Washington in the fall to complete his

degree in mechanical engineering, class of '49. Diploma in hand, and additional summer job experience as a welder's helper, assembly line worker, and designer and builder of garden tractors, Ives resisted recruiting efforts by professors for graduate study ("advanced degrees in engineering were questionable in my mind"), and set about to cut his niche in the world.

Five minutes after the receptionist pages John Schreiner, we're headed towards a cluster of small offices next to a blue warehouse-looking building.

"Have you spoke to Frank?" Schreiner, dressed in a Team Venus jacket, asks with a polite trace of misgiving.

"I talked to his wife last week, and if Frank can't make it over, I'll find a way to his house, and we can do the interview there."

I follow Schreiner up a flight of stairs, push through a steel door into a room with a long conference table and a wall full of technical manuals.

"This used to be Frank's apartment," says Schreiner who turns and smiles.

I spot a kitchen in the back and try to imagine living quarters, this second floor extension of the machine shop below. Frank and his mother, Beatrice, moved into this apartment on property Ives purchased in 1967 when the cost of mandated sewer lines, some \$50,000, for Renton residents forced them to sell.

Schreiner seats me in a conference room overlooking a farm field of decomposed soil ripe for planting. As I scan the history-of-spray-equipment photos that cover the walls, he returns to tell me Frank made it, but doesn't want to climb stairs. We'll meet downstairs, across the way, in the classroom.

After graduating college, Ives struggled to find work. "Boeing would hire you if you were honorary engineering and had five years experience," Ives said. "Well those students didn't exist. There were no honorary engineering students and no one had five years experience. Boeing really wasn't hiring, so I went to work for Bethlehem Steel in their fabricating division."

Located next to Boeing in Seattle, Bethlehem Steel put Ives through a two-year training program for engineers, which, he feels, "probably did me some good." But steel for Ives, in the age of concrete and steel, post war flight to the burbs, wasn't to be. At least, not totally. New wave entrepreneurs all over the country were hard at play on a new sticky enterprise—the hands-on, chemical side of manufacturing—mostly small fiberglass watercraft born in garages, sheds, and father's side Uncle's old barns. Ives built *his* garage, spare time, complete with second floor bedroom and study, in the summer of 1946, fresh out of the army, while working as a yard laborer and welder's helper for Pacific Can and Foundry in Renton, a summer job he held through college. The garage became Frank's mind bank to deposit risk and imagination. Interest accrued in mechanical solutions, savings in what Venus grew into, what MVP's Kent location now resembles, a clean, well-stacked garage, engineer's playground, juiced for risk behind the rhododendrons, the old field, the hum of the machine shop, the excitement of new ownership. (Venus-Gusmer was recently acquired by Magnum Industries and a breath of new life seems to have blown through the facility.) It was in his garage, spare time, where he first designed, built, rented, and sold, garden tractors, trailers, and blades for bulldozers, where he put the finishing touches, spare time, on test equipment for Pacific Plastics, a Boeing subcontractor. The garage also was where Frank

Ives became the man he wanted to be. More than 60 patents later hung in his Venus office to prove it.

"A couple of the engineers from Pacific Plastics remembered me after I made the test equipment and was working for Bethlehem Steel," Ives recalls. "At the time they were trying to build a continuous, corrugated, fiberglass panel machine."

Without much success. After substantial investment by Pacific Plastics in its subsidiary, Fiberpane, which struggled to fab the fiberglass panels, Ives was invited to Bellevue to see "if I could do them any good," really a job offer cloaked as a special invitation.

"I told them I'd work for them during my two weeks vacation from Bethlehem Steel," remembers Ives of his trial period. "I saw quite a few things that needed to be improved, but I wasn't sure I could solve everything. Bethlehem was a good company to work for. They had the highest wages and the best benefits. But for a young guy who was ambitious, you had to wait for someone to die to move up. I was a bit impatient, and some of what I read indicated that the steel industry was in a bad way, and it was just going to get worse. The plastics industry was young and growing, and I thought I should give it a try. It was a gamble, but it wouldn't be the end of the world if it didn't work out."

I follow Schreiner into a small classroom where MVP conducts equipment seminars for new and potential customers. Several moments later, a tall man in light jacket and dark trousers stops by the entrance, inquisitively drums his first two fingers on an aluminum structure leaning against the side of the building near the doorway, shakes his head, and walks into the classroom. He assesses the room, shakes my hand as he introduces himself, then moves far enough inside to allow an entourage of about half-a-dozen men to follow.

"One vision that has always stuck in my mind about Frank is that when we used to have demo days here at the plant, there'd be a whole room full of people, and when Frank started talking, everybody would get quiet and listen. He had that affect on people. It was like that old commercial," Mike Schreiner says later. Bob Read is the only one who stays with Ives for the first 45 minutes of the interview. The others—Tim Deluca, Ron Rivers, Mike Schreiner, Jim Miller, Tom Kleven—leave, then return.

Ives slides into a chair-desk—energetic, hampered, strong, weak, taller than he sounds on the phone. Someone earlier whispered to me that he lost more than 50 pounds, but this is unimaginable. He can only be what he always seemed (defined by others over the phone), or is now—a trim, wizened-not, visionary honcho, a dreamy torchbearer. His eyes accept, analyze, strike all at once. The antithetical has a symbiotic relationship with creativity, seems to be prevalent most in Frank's eyes, "... more failures than successes ..." and "... made up my mind early to be an engineer ...", a look of staunch conviction. Around the room there are diagrams outlining the differences between internal and external mix spray gun flow, nozzle sketches on a flip chart, equipment parts—a simple place for the business of ideas to fail fail fail then succeed in the form of chopper guns, impregnators, or chop-hoop winders. Back in 1985 Ives sold the business after suffering a heart attack, but it still reflects his life and will. "Frank would come back from a business trip, and on Monday morning we'd all sit down, he'd pull out this napkin or scrap piece of paper and say this is what we're gonna do guys," said Jim Miller, the seventh full-time employee Ives hired in 1970.

By August of '53, Ives was a full-time Fiberpane Employee.

Although the job lasted only two years, it had impact. Formally introduced to composites, possibilities unfolded like so many rooms in the garage of Ives mind. "I went back to Bethlehem Steel, told them I'd found a new job, but I'd stay on until I finished my projects here," he said, taking time to catch his breath and thoughts. Ives wasn't content with his new company's continuous, corrugated, fiberglass panel machine. "We had another 20-feet of building, enough to expand. I changed the drive system to get more speed out of it, more variation and control. Then I decided we weren't doing a very good job of impregnating, so I convinced the boss we should make a new impregnator unit, a complete new design, which I did from drawings I worked on at home. It put a little tension on the mat, forced the resin up through, and introduced the parallel strand ... anyway, the idea was to run it over an arch, put these strands up under tension and pull the glass down into the resin. This forced the air up ahead of the resin and impregnated it."

Ives impregnates his past with excitement in every detailed account of every project he's ever worked on, truly alive in the gristle of mechanical detail. The back-up explanation that comes years later, the verbal blue print of his career, is part of verification testing. For nearly twelve years, after Fiberpane closed its doors in '55, Ives continued to be more interested in the equipment and machinery that makes composites products than in the products themselves. Prove the concept, alone in the garage, now expanded with an add-on shop, plus a couple of masqueraded chicken coops, a "legal way to get a building up, the inspector would come out, inspect the footers, and you'd never see him again." Ives saved money from his Fiberpane job, actually worked a deal with a building supplier to sell scrap corrugated panels at 20 times the current rate, and before the company ran out of development projects (the owner sold the patent rites to the continuous, corrugated, fiberglass panel machine), made rollers and bung hole mixers.

I call Frank on July 5th to ask a few more questions. He sounds... I realize how hard it must've been to present himself at the interview two months ago. *Having cancer and undergoing treatment can be a confusing and overwhelming experience. Many people feel a range of emotions whilst coming to terms with the illness and learning to cope.* "How do you feel Frank?" "Oh pretty fair, some days are better than others," he responds with a traceable itch toward the experimental.

"All of a sudden this guy came out in khaki pants," Bob Read remembers with a chuckle. "I couldn't tell if he was the janitor or what. He told the engineers who were standing around measuring this and that, 'I thought we took care of this a month ago.' Then he disappeared into the machine shop, came out with a part, installed it, and from then on the pump worked great."

It was spring of 1975 and Read was on the lookout for ways to expand his business. North West Performance Boats, which fabricated flat bottom racers and high performance ski boats, sought to



Original H.I.S. gelcoat unit.

capture some industrial work, namely with a fleet of commercial fisherman and crabbers who wanted to line their storage tanks and refrigerated holes with fiberglass.

"So we decided to build a mobile, chopper gun unit," Read continues. "We got the third HIS [Hydraulic Injected Spray] unit built by Venus, the one they still build today, with an eleven-to-one pump, internal mix, and, of course, it had enough horse power in it, you could run 125-ft of hose."

Read mounted the pump on a newly purchased Dodge Caravan, outfitted with a diesel compressor. The pump, however, stalled on either the up or down stroke forcing Read to pull the air chamber apart to trip it for a restart. After speaking with the distributor, he was invited up to Venus where he was

first introduced to the man in the khaki pants, Frank Ives.

"You can talk to Frank about any technical problem whether its composites related or not," says Read who, over the years, purchased a Venus flat sheet reciprocating machine, and more RTM equipment before becoming a Northwest region distributor for the company. "He's a wealth of knowledge. He introduced me to resin transfer molding in 1974. A customer of mine, who made gloves, used these cedar boxes from the early '40s, in which the glove parts were stamped out. The women who worked the line complained of cedar splinters, so the owner asked me to build fiberglass coat boxes. We started spraying them, but there was too much labor. I called Frank who'd just returned from Europe where he observed RTM. We sat down, drew a few sketches, and I went home and converted one of my spray boxes to RTM. That led to 2500 coat boxes over the next year-and-a-half. I wouldn't be surprised if that wasn't one of the first RTM ventures in the US."

At the end of the interview I shake hands with Ives and Read offers to take me on a tour of MVP. Mike Schreiner (John Schreiner's Uncle) accompanies us part of the way before sliding off for catch-up conversation.

When we reach the machine shop, Schreiner tells me that during the 80s, only Boeing machined more stainless than Venus, according to sales records of Alaska Copper and Brass, the main supplier of steel to industries in the North West.

"For Frank, it was important to be totally self sufficient, to build all equipment components on site," Read adds. "Some of the air motors that power resin catalyst pumps he made still run after 30 years. And when you think about it, most of the engineering technology that goes into spray and other equipment today was invented by Frank. He had today's state-of-the art technology in 1960. He probably had marketing problems because he was so far ahead of his time."

We walk outside, toward the concrete mushroom. Read hesitates, as if suddenly struck with a thought, then offers to treat for lunch.

As we climb into his '67, red and white, "Amph" car (one of 4200 amphibious vehicles made by Karlsruhe Industrial Works in Germany) he mentions there's something I ought to see.

The request came from Dr. Enrique Feloi Tufi, one of Costa Rica's top surgeons, who also owned Construflex, a FRP shop in Alajuela, the country's highlands, near the rain forest. Build me a corrugated fiberglass panel machine, Tufi said to Frank Ives in the spring of '78.

"Frank came in to the engineering department like he usually did, with a couple of sketches of what he wanted," said Jim Miller. "It took us close to a year to build the machine, then we set it up and ran it for a while before shipping it to Costa Rica."

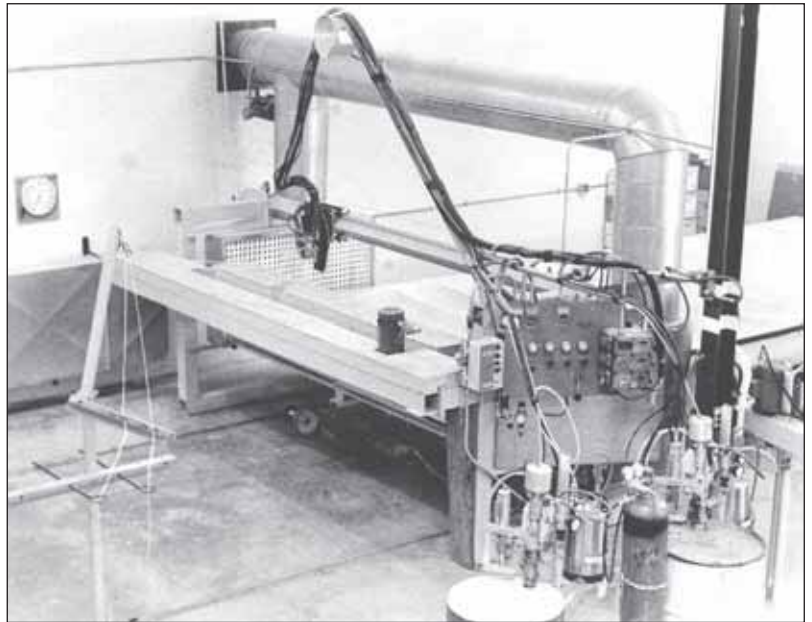
What the shippers didn't tell Ives was that they were only going to deliver the machine, packaged in unsupported containers, to the port of Limon. By the time it reached Alajuela, about 25 miles north of San Jose, on a flatbed truck bouncing over rocky terrain, much of it was damaged.

"We spent two weeks before Frank arrived using pry bars and hammers to get it back in shape," Miller continues. "We got it running the day he arrived, and we pushed out more corrugated panels in two hours than they were able to produce by hand in a month. Frank built the first corrugated fiberglass machine for the forerunner of the Filon Corporation. Frank is easy to work for, a very good teacher. He used to say, 'I'll give you enough rope to hang yourself' and if you proved your worth, he left you alone next time around."

Left on a long stretch of sunny road toward Auburn, Read elaborates on his 30-year association with Ives. Like so many who worked with him, Read is in awe of Ives' ability to see the infinite in the world of mechanical, chemical, electrical, and aeronautical refinement. It's an aesthetic appreciation of almost classical Roman proportions. On a grand scale, Ives is an obscure, backyard genius, a modest entrepreneur. In the composites industry, he's the Caesar of modern methodology—*let the work be my empire*. Every industry has one, the man who streamlines application, operates on a cellular, parts-per-million level, takes behind-the-scenes risks to make life easier for his customers so they can reduce rework and rejects. "It's why I wanted to do a story," Read says. "Most people have no idea what Frank has contributed to the industry."

We hang a right into another warehouse-looking building and drive around back. Read's excitement grows noticeably, like a kid waiting to get on a roller coaster, as he fishes a key out of his pocket and we enter through a side door. When Ives sold the Kent location, he held onto this 80,000 square-foot modern facility in Auburn primarily used for research and development, whatever crystal ball notions occupied his mind. Now it's a graveyard for a smattering of decayed projects. "There's hardly anything left from even a year ago," Read laments. "Everything has been sold off." Or, a stumbled upon archeological site of early technological treasures. The excitement and energy that used to fill this space remains on standby, like in an easy chair, taking a snooze, waiting for a synapse to fire.

For almost 12 years, before moving to Kent with his mother and starting the facility now owned by Magnum-Venus, Ives worked in his garage, with a sparse crew of part-time help. Along with continuous corrugated panel machines, over the years he developed bridge, gantry, and telescopic impregnators, fiberglass and gelcoat reciprocators, syntactic foam, and a RTM hydrajector. But he packed his biggest punch in the chopper gun.



First Chopper Reciprocator, 1970.

"From long ago, I always used the airless principle of dispensing resin, because I recognized that it's solvent," Ives recounted during the interview. "It's foolish to waste material blowing it away, which is what the air aspirating systems were doing. So I was a believer in the low-pressure concept. Also, ideally, I thought it would be nice to introduce the catalyst to the resin and mix it prior to applying it to the mold."

"Nothing ever happened exactly right. I used high-speed film and colored water, instead of catalyst, to monitor everything emitting from the gun, but they were too slow and didn't really tell me anything."

Determined to go beyond misleading natural assumptions into what really occurs at the 'level of nozzle' with internal mix spray guns, right about the time Ives moved to Kent, his accountant, who also worked for United Control, introduced him to UC's chief test engineer.

"Well, he came up with a fancy, techtronic oscilloscope, four-channel job, all the extras, but it was ten grand!" Ives continued with a "whew" reminiscent of a black-and-white sit-com era of expression. "That was all the money I had."

Ives thanked him, but couldn't get the idea out of his mind. The oscilloscope broke down ratios to one part-per-million. Two months later, Ives placed an order. Six months after it arrived, "I had most of the bugs worked out. That blasted thing could tell you how many times the ball bounced on the seat of a foot valve or the speed of a piston. It was incredible. We could expand those traces out to catch everything, left or right. The problem was we didn't know where it all came from. That took a little while. We finally came up with something in the right mean. It helped us appreciate how difficult achieving tolerance really was. We were dealing with something that was a hundred-to-one ratio."

Four patents resulted from that \$10,000 investment. Pragmatic, popular innovations in chopper gun technology continued over the years as Ives expanded his business, conducted R&D, played, experimented, did fun stuff close to the soul.

"Most of us were unaware of Frank's long-term goals," recalls Product Development Vice President Tim Deluca. "If a project at the Auburn facility was nearing completion, we'd all kid around and



say it's time to pull black plastic sheet over it. And that's what we did. It was kind of a longstanding joke. Frank would wait for the industry to get ready for it, and we didn't know until sometimes ten years down the road what he was planning for."

Several Venus employees were recruited to build the Auburn site, which took three years and opened in 1980. Immediately inside the building sits a '55 Chrysler with an eight-foot by twenty-foot flatbed, converted by Ives to haul 20-foot steel rods, pipe, or tubing around the shop. It's a vehicle made commercially today, one of those assumed to have been in existence forever, taken for granted. "I've seen them in magazines," Read says. "Just another example of Frank being ahead of his time."

Several versions of a solvent reclaimer, a mixed meter piece of equipment, large master molds for epoxy flat panels (beyond a typical fab shop's capability, to be used in conjunction with recipicator and built for the Chinese to produce large refrigeration units), a pre-pultrusion, extrusion-type machine that produced continuous fiberglass pipe (85-ft polymer concrete utility poles), a continuous fiberglass tape-laying machine for irrigation canals—just a few of the projects Ives worked on here. Also inspired here was a semi-turnkey operation for producing cultured marble.

"It was a totally automated, two-tier conveyor system," said Deluca. "A vibrating mold would go through gelcoat on the upper tier, then be transported by a scissor-lift down to the lower tier where the mold would be filled. Then the part went into curing ovens and on to a de-molding station."

Around back is a homemade backhoe, before there were backhoes, and various glider and airplane parts, a legacy of continuous refinement in the weeds.

One of Eric Kleven's fondest childhood memories is when he traveled from Minneapolis with his family to Seattle to visit a man who might become his grandpa.

"He took us up in his Cessna, my mom, brother, and I, and we flew around Mount St. Helens," Kleven remembers. "It erupted later that year. That plane ride was one of the most memorable experiences of my life."

Several years before Eric was born, in the spring of '72, Margaret Jukulen, a bookkeeper for Northwest composites, a Venus distributor in Minneapolis, stood

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An early Venus ad.

with her father and another couple in the shop at Venus. It was demo day, and Frank Ives had walked by and said hello. For some reason, now close to 50, the man who said he never had time to get married, remembered her from previous demo days. Margaret and her father worked for Northwest.

Long distance relationships being what they were before email and low airfares, Margaret and Frank courted for a year before marrying in February of '73. Not long after, Margaret moved her two children to Kent, Washington. Tom, Eric's father, worked for Venus as a lawyer and international sales rep.

"My younger brother and I used to go to work with dad when he was in town," said Eric. "He traveled quite a bit, worked strange hours because he had European and Asian clients. But he'd pick us up from school, and we'd go with him."

Eric and his brother Mathew quietly slipped away from the paper trail, brief case world of his father, and shadowed the stuffed pocket protector existence of grandpa Frank Ives. Eye level to Ives' signature khaki trousers, Eric remembers him always being there, night or day, with a book or popular mechanics magazine, the latest ideas for a solvable world, shirt pocket stuffed with pencils, protractor, slide rule, calculator—slave tools to brain waves to solve it. The malleable Kleven brothers followed their grandfather everywhere, tried to listen to their father and stay out of trouble. One of Eric's most seductive recol-

lections is when he saw his grandfather reading, reading, reading about new ideas whether composites related or not.

Not long after Ives sold the Kent facility to Gusmer (now MVP, located on Ives Road), the Kleven brothers were 'transferred' to the Auburn site. Eric turned 13, pulled weeds, swept the shop floor, and pondered over blue prints of airplanes and machinery built by his grandfather. Summers before college he learned to draft, weld, paint machinery so it didn't corrode, and assisted in the construction of a cultured marble, floor tile machine.

"At first, the yard work was something to keep us out of trouble, to supplement our allowance until we became somewhat useful to him," Eric laughs. "Then, when I was 16, he let me play mad scientist in his resin lab, trying to find the right mixture for different applications. I learned about auto acceleration, how different formulations cured, didn't cure. He left me on my own pretty much."

After physics and astronomy courses at the local community college while still at Kent Ridge Senior High, Eric went on to Winona State University in Minnesota and took a BS degree in Composites Materials Engineering with a mechanical influence. Now he works as a research engineer for the Ford Motor Co. in Detroit, a natural transition from the early days peering around Grandpa's khakis at Venus.

"He lived and breathed aviation," said Eric. "One of the hardest things after heart surgery was giving up his pilot's license. He was always building models, flying and crashing them. When he pinched a nerve from a bone spur in his arm and the nerve collapsed, he couldn't lift his arm and the muscles atrophied. So my brother and I made a vice using composite springs and dowel rods. It attached to his belt, sat on his shoulder, then attached to his arm. The spring was just enough. When he used what muscle he had, it did the rest of the work for him. We used my brother's shoulder for a mold, used Mylar, and laminated it by hand."

Call Frank on August 2nd and interrupt his lunch. "Sorry Frank, I lost track of the time."

"Oh, that's ok, I'm not a speedy eater these days. All I do is eat and sleep."

I explain that in the five albums of photos he sent, there are machines galore, but few pictures of him.

“I’m not trying to sell me,” he jokes. “I’m trying to sell machines.”

The urgency I’ve felt to write this article begins to evaporate. “He’s not extremely talkative, unless it’s about technology,” says Kleven of his grandfather’s unpretentiousness. “But he’ll sit down at dinner, pull out a napkin, draw plans for a machine, turn it over to a draftsman, and have it built. That’s how he invents things.”

“He used to come back from a trip with sketches on a napkin, and say, ‘This is what we’re gonna do boys,’” adds Miller. And even though the article starts to replicate itself as everyone sees Ives in the same light—random ingenuity in khakis—before I have to turn it over to design, it seems a couple paragraphs short. Or, the opposite is true.

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