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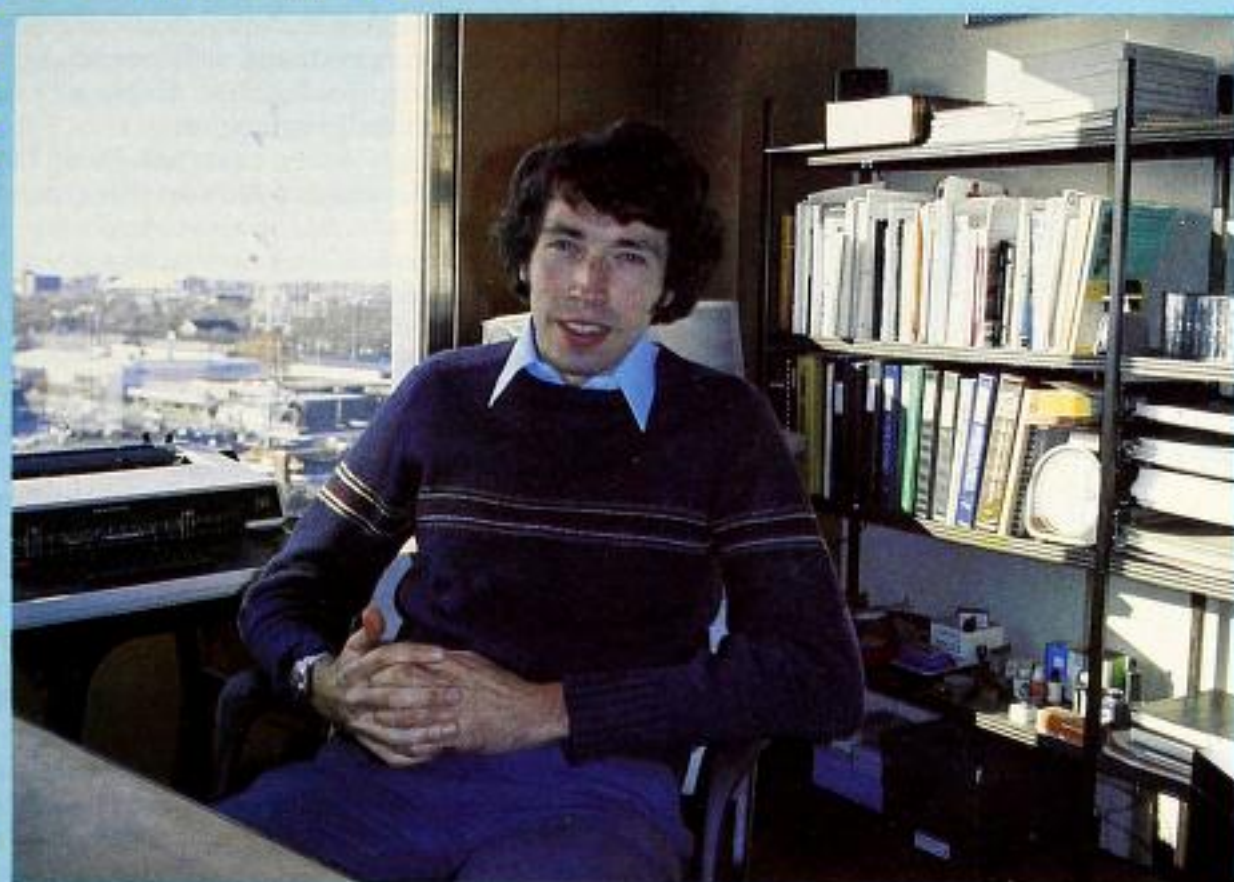
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ECR Elevator Control - Right
 PRP PRAND - Right
 P PR (Top)
 LVL LANDING WHEEL (Left)
 TLE Tail Tip - Left
 RFP RUDDER - Right
 S SNO (Bottom)
 WFP WING FUEL
 WFC WING FUEL CONTROL
 WLS WING SNO

Exec SubLogic:

On Course and Flying High

BY DAVID HUNTER



How fast is too fast?

How big is too big?

Ask the ghosts of Elvis, Marilyn, and James Dean. Ask the ghosts of Sutter, Keats, and Alexander the Great. While you're at it, ask T. E. Lawrence, Amelia Earhart, and Dostoyevsky.

Elvis became a king and a slave to his subjects before he knew what hit him. In three years Keats wrote more good poetry than most poets write in a lifetime and then he died. Alexander the Great conquered most of the known world before reaching the legal drinking age in present-day California.

The Harder They Fall. Speed is exhilarating. Uncontrolled growth is intoxicating. As long as youth can dream, life will never move fast enough.

Whether it's motorcycles, cars, planes, skiing, volleyball, or assembly language, Bruce Artwick likes speed. He likes Winchester disk drives, BMWs, zooming through undergraduate and graduate school in four years, and tearing down the Angeles Crest Highway on a Suzuki at a dangerous clip. The president of SubLogic Communications Corporation, Artwick is a tall, quiet, twenty-nine-year-old bachelor. He possesses a remarkable mind, which has created several of the finest programs to grace the Apple's RAM.

Contrast Artwick with Stu Moment. Outgoing, of medium height, and possessing an exceptional love of flying, Moment is SubLogic's chairman of the board. A businessman, Moment has steered the company to

Opposite page: SubLogic's chairman of the board, Stu Moment, calls himself a "crazy aviation fanatic." This page: top, SubLogic's president and chief software engineer Bruce Artwick at ease in his office—christened Lazer Bay One from the movie *Tron*; bottom, Moment and Artwick pose with the faithful company plane, a Cessna 150.



Both Artwick and Moment are licensed pilots and fly all over the country when the need arises or the spirit moves. Above, Moment listens for important information on the radio and scans the sky for other planes while approaching the University of Illinois Willard Airport.

its present course, complementing Artwick's superior software engineering talents with organizational and financial skills. He's even picked up some modest programming skills, designing a system for logging flight hours at a fair-sized flying institute.

Redford and Newman. Lewis and Clark. Laurel and Hardy. Jobs and Wozniak. Artwick and Moment. The grand adventurers riding the hard trail, living and playing at lives larger than life. It's an old story.

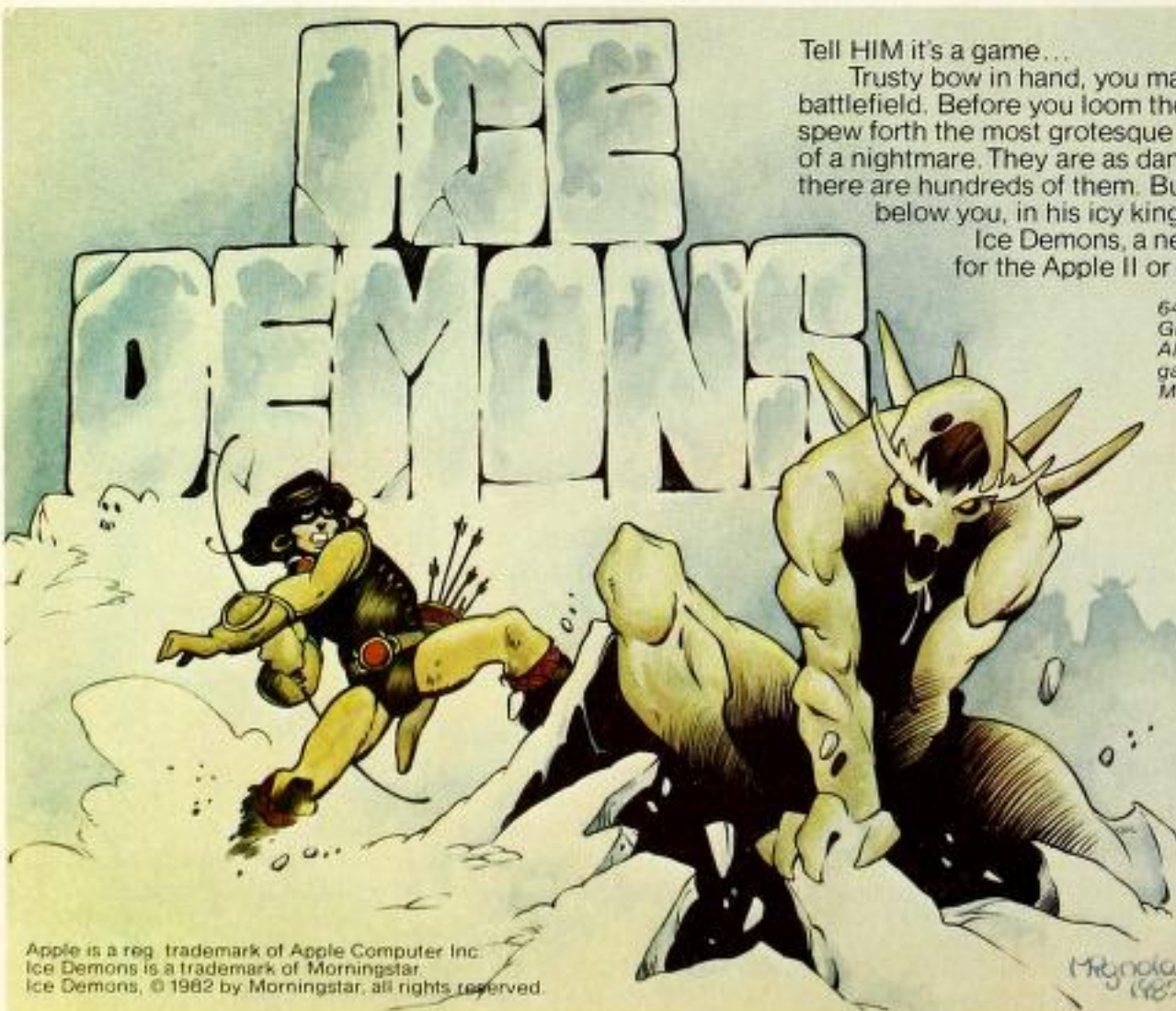
Leaving hyperbole for the poets, the truth is that Artwick and Moment are two thoroughly likable individuals who confess to hiding out in central Illinois, seemingly far away from the spotlights and hubbub. Unfortunately, spotlights and hubbub are notorious for seeking out the famous, no matter how hard they try to hide. Not intentionally being mysterious, the company SubLogic is nevertheless something of an enigma. Who are they? Where did they come from? Where are they going?

One thing is known. Artwick's *Flight Simulator* for the Apple was a monster success in the first two years of its release. It placed second on *Softalk's* first Top Thirty poll in October 1980. It was last seen on the Top Thirty in May 1982's poll at number twenty-seven. *Flight Simulator* has been pulling strong on the Strategy Five for sixteen straight months, usually second or third. Including the TRS-80 version, Artwick's *Flight Simulator* has sold more copies than any other flight simulator of any kind in the world.

"And It Has Always Been Attributable to Human Error." Champaign is a farm community and a college town—home of the Fighting Illini and of the third busiest airport in the state and birthplace of the most famous fictional computer, HAL, in Arthur C. Clarke's *2001: A Space Odyssey* and *2010: Odyssey Two*. It all started here.

Artwick and Moment first met in the early seventies when they were attending the University of Illinois. They roomed together with a dozen other spirited students in a big old house dubbed Gamma Ray Zappa. The house was evenly split up among AV (aviation) jocks, parachuters, and electrical engineers.

Moment was one of the AV jocks. Rakish looking in his black flyer's jacket, Moment flashes a winning smile and recalls the true roots of



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his love of flying: "My mother was six months pregnant with me and she flew in a Piper Cub through turbulence. I was born a month early, feet first like a paratrooper. I first flew in a small plane at fifteen. I was really into engines and decided I wanted to be an airplane mechanic."

Moment enrolled at the university's Institute of Aviation and began his flying career. He recalls fondly his student days, a past that both Artwick and Moment are very much in touch with.

"I was like any good college student at the time. I protested and had a guitar," says Moment. "I finally gave that away to our vice president of marketing, Norm Olson, a year ago."

Gamma Ray Zappa was not a real fraternity, though fraternities were a big thing around campus. Still, the ad hoc brotherhood included a pretty crazy bunch of guys.

Bruce Artwick was one of the electrical engineers. "We agreed that Stu would teach me to fly if I taught him about digital electronics," he remembers.

When Artwick wasn't entrenched at the university's digital computer labs, he was doing the things only college students and devil-may-care parachuters can think up. He enjoyed the vibrant atmosphere and the chance to learn about flying.

Rebel without a Cause. An electrical tinkerer for years, Artwick surprised no one when he started to build his own computer. On his home-made BACS 1000 (Bruce Artwick Computer System), Artwick did some "3-D stuff and even a real-time runway. I just had to have my own real-time 3-D graphics."

Through most of his college career, Artwick was hardware oriented, particularly interested in computer design. Then his thesis project called for creating a real-time flight simulator on the PDP-11. Graphics soon became a major concern and hobby of Artwick's that would figure significantly in the genesis of SubLogic.

Artwick completed his bachelor's and master's degrees in electrical engineering in four years. When he started college, Illinois-born Artwick says it was a fifty-fifty chance that he would study either music or engineering. Once he made the choice, thanks to the excellent curriculum at the university, Artwick pursued his passion for computers ferociously. When he had finished, he had no trouble landing a job at Hughes Aircraft in Culver City, California.

While he was at Hughes, several interesting things happened to Artwick. Twice, midair collisions between small planes occurred close to his house; one time debris landed in the swimming pool. He learned to love the Southern California mountains and their winding roads that beat the cornfields of central Illinois for riding motorcycles. Artwick also began dreaming of founding a big company with hundreds of employees.

Back in Champaign, flight instructor and business major Moment shared some of Artwick's dreams. In early 1977, they decided to form a company. Back at the university's digital computer labs, Artwick worked on devices known as sublogic circuits, and that's where the company name comes from.

"We've had people think we make logic units for submarines. One or two people have called thinking we were a mental institution," Moment recalls.

South by Southwest. In early 1977, Artwick wrote an article on 3-D graphics for *Kilobaud Microcomputing* and SubLogic sold its first product, a 3-D graphics package for Southwest Technical Products's 6800 processor. In those early days, neither Artwick nor Moment had any real expertise in marketing, though their job wasn't that tough. There were only about two hundred computers with that processor.

Other early products from SubLogic were graphics drivers for S-100 boards, drivers for Vector graphics, and television dazzlers. Artwick's megacompany dream started slow, but the two fighting Illini gained considerable knowledge about the market with those early forays into hardware and software.

Artwick was still working at Hughes and Moment was still plowing through college when the two decided to publish programs for machines with a wider circulation. In 1978, that meant TRS-80s and Apples. But first Artwick had to return to Illinois.

Besides pursuing the dream of heading his own big company, Artwick chose to leave Hughes because the rewards for good work were too

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few. "Only generals would see the results," he explains. "I also wanted to leave Los Angeles because of the high cost of operating SubLogic from two locations."

Anatomy of a Dream. One of Artwick's heroes is Seymour Cray, who left Control Data in the mid-seventies to start his own company. Cray discovered a niche in the computer industry and formed Cray Research to fill that hole. Supercomputers are Cray's forte, and Artwick looked for a similar niche in the microcomputer market. He found it in graphics and simulations.

In June 1979, Artwick packed up a U-Haul and moved back to Champaign. Four months later, SubLogic published its first Apple program, *A2-3D1 Graphics*. Three months after that SubLogic launched *A2-FSI Flight Simulator* for the Apple. A TRS-80 version of the flight simulator, *T80-FSI*, was released simultaneously. Unlike the typical first-time-in-business Apple software publishers—Sirius, HowardSoft, Synergistic, Sierra On-Line, and many others—SubLogic diversified into the Apple market instead of out of it.

Artwick took advantage of the Apple's larger memory to add lots of little improvements impossible in the TRS-80 version of the flight simulator. The animation is 25 percent faster and the instruments are closer to those of a real small airplane. On cassette at first, as were many Apple programs in those days, *A2-FSI* soon became available on disk and sales took off.

In June 1980 SubLogic got its own Cessna 150. The recession had already hit private aviation, but the eighteen-year-old aircraft had been equipped in the factory with long-range gas tanks at the request of its original owner. This made cross-country flying economically feasible. Moment and six-foot two-inch Artwick crammed into the tiny two-seater and flew all across the country. They would take test flights to see if Artwick's mathematical simulations were accurate. It was very gratifying to fly in the company plane and see Artwick's software engineering coincide with the real thing.

Real Men Don't Eat Applesoft. Artwick prefers assembly language because of its high performance characteristics and the results, which run very fast. Higher level languages like C and Pascal are 75 percent as fast as assembly language, and that extra 25 percent, Artwick and Moment believe, is what makes SubLogic competitive. You need good tools to work in assembly language, because it's not a nice structured format. Still, that difference of three or four frames per second in the animation is what the competition has to contend with.

In 1980, SubLogic hired its first full-time employee, to answer the phone. Rhonda Fultz filled the role until she got married and quit. Julie Newman took her place and is still with the company, though she now performs in a different capacity. Newman is distribution manager and the major force behind SubLogic's superb dealer network.

Soon after Newman took over Fultz's position, SubLogic hired Teresa Evans to handle the shipping. A key person for the last year and a half has been vice president of marketing Norm Olson. An old college chum of Moment's, Olson had a motley college career that included psychology, premed, and rhetoric. When Moment and Artwick were looking for a marketing person, they chose Olson for his "fantastic" background.

Artwick and Moment tried to create an image for SubLogic. Particularly in the Apple market, they didn't want to be seen as just another software publisher. Caution is perhaps the key thing here. Artwick and Moment believe in putting out a few quality products and providing strong service for those products.

"Money is slightly secondary to us," explains Moment. "We've made plenty for where we live. In central Illinois there are no Joneses to keep up with."

It's cheap to run a business in Champaign and it's cheap to live there. How cheap?

"This spring I'm buying five acres at \$4,000 a piece," says Moment. "I'm building a big house for my family and the entire thing will cost around \$80,000."

The Luck of the Irish. Nestled in the center of Champaign is a local institution that has played no small part in the SubLogic story. Artwick describes Murphy's Pub as the kind of place where "all the engineering majors go to drink green beer on Saint Patrick's Day." Warm, dark, in-



Above, view of the University of Illinois Willard Airport—third busiest in Illinois—from about two thousand feet. Artwick and Moment dream of moving SubLogic's offices out to the airport—they really like the flying environment.

time, and supplied with a well-stacked jukebox, Murphy's Pub is the site of "some of the biggest decision making" for the SubLogic executives.

For almost two years, SubLogic's only Apple products were the *A2-FS1 Flight Simulator*, *A2-3D1 Graphics Package*, *A2-3D2 Enhancement*, and *A2-GE1 Graphics Editor*. Early in 1981, Artwick and Moment decided to start experimenting with a slightly more diverse product line. In May 1981, calling themselves the "engineering and graphics experts," SubLogic released *Saturn Navigator*, by Wesley Huntress, author of EduWare's current hit *Rendezvous*.

A hi-res adventure/simulation, *Saturn Navigator* is a thinking-person's arcade game, a good example of the SubLogic image. You don't have to contend with invading aliens and you're not searching for a long lost monolith or the secret chamber of Urbana. You have to navigate

through the rings of Saturn and negotiate an orbit around the massive gas giant. It's not easy, but it's an educational and rewarding simulation.

Another good example of SubLogic's elusive image is their advertising. Like many a young company that sprouted up at the start of the microcomputer boom, SubLogic was at a complete loss and searched for an agency to handle this all-important task.

"We looked for one in the Yellow Pages," remembers Moment. "The first guy we went to see was choking on a tie but didn't impress us. Then we found Bob Chapdu of ADLIB who ran a creative and artistic place, but he wasn't trying to be Madison Avenue." He was also sympathetic to SubLogic's conservative image.

Most growing companies eventually have to move up to color, and late 1982 saw Chapdu and ADLIB launch SubLogic's first big advertising campaign—for Artwick and Moment a momentous, almost scary, step. They wanted to be colorful but different. The result is a group of distinguished looking full-page ads that aren't misleading. Unembellished screens from the programs are featured prominently, giving potential buyers an idea of what they'll be getting.

It's not a new approach, particularly for business programs, but in the world of entertainment software it's a welcome change from the usual airbrushed extravaganza. SubLogic, with the help of Chapdu, has taken the idea and used it in packaging as well. Hanging on the rack in the computer store, a SubLogic product always has a sample screen to persuade the buyer and make the salesperson's job a little easier.

"Pinball Wizard, There Has To Be a Trick." When *Raster Blaster* was released, Budge's masterpiece seemed to be the last word on the subject. Few people would have predicted that two other pinball programs would achieve even a modicum of success a year later. *Raster Blaster* unseated *VisiCalc*; it sold systems; it was a phenomenon.

Never underestimate Bruce Artwick's talent. *A2-PB1: Night Mission Pinball* was released in late spring 1982 and climbed to number five on the Top Thirty in July of that year. The reviews were staggering. How had Artwick done it? The animation was so smooth, the configuration of features so realistic and competitive. The Cosmic Mode was the rave of the day.

What Was That?

The blank space to the left of this column of type ran on page 290 of the December issue.

Softalk's art director disclaims that space as a representation of all he's been able to accomplish with the Apple's hi-res page.

Softalk's publisher disclaims that space as his collected wit and wisdom.

Those readers of keen insight and a puzzle-solving bent probably referred to the Ad Index, where they ascertained that the space belonged to the Keyboard Company.

Let it hereby be made known that the Keyboard Company had much more to say than the space on the left indicates. In the production process, we muted the Keyboard's voice.

Astute readers may recognize the Keyboard Company name as belonging to Apple. The old Keyboard Company was folded into Apple and dissolved. The new Keyboard Company picked up the remnants of that process but feared the name might cause confusion.

So now they're the Accessory Products Company, and what they had to say as the Keyboard Company is the essence of the Accessory Products ad to the right of this column.

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