ARTIST'S ARTICLE

Century of Light
Shines for Twenty-Five Years

Jim Pallas

Jim Pallas, an artist who pioneered the use of technology in art, collaborated with computer sage Rene Vega and programmer Randy Mims in 1979 to create Century of Light, one of the earliest interactive public sculptures. In this article, Pallas describes an earlier struggle to incorporate technology into sculpture, the selection process that led to this, his first public commission and the collaborative process. Sited within a pedestrian mall in downtown Detroit, the sculpture sensed viewers' movements, sounds and light. Unfortunately, the sculpture was located in an ill-conceived plaza. Although the city administration mismanaged the site and allowed the sculpture to be destroyed 25 years later, the electronics and program were rescued and remain intact.

A PHONE CALL

In 1978 my friend Dennis Barrie, head of the Detroit office of the Archives of American Art, called and said, “I put your name in for a possible public commission. The Eastern Michigan Electrical Association wants to commemorate the centennial of Thomas Edison’s invention of the light bulb.”

I said, “The incandescent light bulb is way over a hundred years old and wasn’t invented by Thomas Edison anyway.”

Dennis said, “Look, smartass, do you want this commission or not?”

The Eastern Michigan Electrical Association (EMEA), now defunct, was a vertical association of manufacturers, distributors, suppliers, unions, inspectors, companies and others, including a monopoly, who were involved with electricity in southeast Michigan. They had asked for and been given a site by the City of Detroit for their commemoration. It was located in a five-block redevelopment of Washington Boulevard, a once-elegant boulevard in the heart of downtown. The city had retained an architect to radically alter the area to function as a center for restaurants, shops, hotels and theaters. The emphasis was on pedestrians and lighting. The downtown was becoming desolate because of crime, which many simplistically blamed on inadequate lighting.

The architect designed a pedestrian mall by installing broad, brightly lit walkways, several waterworks, an amphitheater and other performance spaces, benches and plantings. An antique trolley ran through the mall and hooked up with the People Mover, an existing monorail that circled the city center. The design attempted to invite people to restaurants, bars and theaters and to experience lively open-air urban attractions such as informal street musicians, dance performances and similar activities. The selection committee asked me to submit a maquette for a sculpture that would use electric lights in this proposed setting.

I offered a circular sculpture of 144 illuminated 12-inch globes arranged in a pattern based on a 13th-century Persian tile matrix (Fig. 1).

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Fig. 1. Mandala. (© Jim Pallas) Mandalas are holy images in many religions, often representing the universe. This mandala is based on a 12th-century Islamic tile pattern. In the Century of Light, the steel structure that held the lamps was the linear pattern of the tiles’ polygonal edges. The lamps occupied the 144 intersections in the pattern.
The sculpture would be submerged in the 20-foot-diameter pool of one of the mall’s water features. The pool retained water falling from an overhead glass canopy. The display would change patterns in response to the sounds and activities of people around it. The idea of a submerged light show in a fountain was familiar to Detroiters. Belle Isle in the middle of the Detroit River is a park designed by Frederick Olmsted. It has a fountain lit at night by a display of submerged colored lights.

I knew the technology of integrated circuitry at that time would be unfamiliar to the committee. What’s not understood often gets rejected. So I made a maquette (Fig. 2) that could stand on its own as a work of art independent of its role as a maquette.

At the presentation, the nightmare of any artist working with cutting-edge technology occurred. When I toggled the switch to bring the display to life, nothing happened. I tried it again. Nothing. I checked the power. I tightened the plug. No action. Embarrassed silence and flop sweat. The committee suggested I go on with the presentation. I did.

The committee complained that replacing burned-out lamps would require draining the pool and proposed that I raise the grid of lights up to the 18-foot height of the waterfall. Also, they didn’t like my title, “Singing Star,” because it referenced neither electricity, lights nor Edison. They suggested “Century of Light.” They left the room to confer. I turned the maquette upside down. Close inspection revealed that a connector on the circuit board was askew. I straightened it and toggled the switch once more. The mesmerizing light display dazzled the panel as they returned. In hindsight, I couldn’t have planned it better. I got the job.

It was agreed that the members of the EMEA would provide as much of the labor and materials as they could and would pay for what little they couldn’t provide. I would be paid $5,000. But the piece had to be finished in nine months. I heard later that some participating companies eventually wrote off several hundred thousand dollars spent on the project.

**NINE YEARS EARLIER**

Just prior to making the leap as an artist into high technology, I experienced some success with small sculptures (Fig. 3) that referenced sound and movement. However, they neither moved nor produced sounds. They were juxtapositions of groups of onomatopoetic words such as *zoom, roar, click, rumble* and *zap* sawed from brass, silver or aluminum and mounted on four rubber and aluminum wheels. So when I decided to make a sculpture that would actually move and produce sound, I continued the wheeled concept. I made *Light Vehicle* (Fig. 4), a small vehicle that randomly rolled on the floor until it found a place with a specific light level. There it stopped until the level changed. Then it wandered again until it found that level of ambient light and stopped. I learned enough about electronics to design and fabricate circuitry employing a photocell to control the motor. I assembled gears that would enable the vehicle to change direction when it bumped objects in its path.

After several months I had a working vehicle. It was ugly, definitely not a work of art. But there was a bigger problem: It was not reliable. Most times it worked beautifully. It was very sensitive to light changes. Just getting near it would change...
the ambient light enough that it would move a short distance until it found its preferred illumination. But other times it would just sit there and buzz. I double-checked everything. I changed out most of the circuit’s components. I showed the circuit to people who designed circuits. They said it checked out and shouldn’t do this. Eventually I called an electrician friend and told him my problem.

He asked, “Are you in your studio now and is it doing it?”
I said, “Yes, if I turn it on.”
He said, “Turn it on and put the phone near it so I can hear the buzz.”
I did. He asked, “Are your studio lights fluorescent?”
“Yes.”
“Your circuit is working fine. In fact it’s working too well. When fluorescent lights are on, they’re actually off half the time and during that time the room is dark. This happens sixty times a second. Your vehicle is turning itself on and off sixty times each second. That’s the buzz you hear.”

Clearly, I did not have the breadth of technical knowledge nor practical experience needed for a project like Century of Light. I needed expertise.

FINDING THE EXPERTS
Luckily, a group of computer enthusiasts had recently created the South East Michigan Computer Organization (SEMCO). I requested a spot on the agenda at their next meeting and showed a few slides of my previous works. I described the Century of Light project and invited interested persons to meet me after the meeting. That was how I met Rene Vega, a computer science student at the time. Vega and I recruited another SEMCO member, Randy Mims (see Fig. 5), who had a reputation for writing elegant code. Vega blocked out flow charts for the various circuits required to digitize the analog outputs of the radar, microphone and photocell and communicate that data to a 6502 chip, the Sym-1 [1].

Vega also designed the circuits required to use the output from the microprocessor, a Sym-1 by the Synertec Company, to turn individual lights on and off. I translated the charts into integrated circuits and other electronic components. I drew the pathways with India ink and tape and found a local shop to make our printed circuit boards, 26 in all. I designed the patterns of lights and their animation and the large iron mandala. Mims outdid himself by creating an extremely small but powerful and versatile program that uses a script of intuitive commands to create beautiful light pattern behaviors based on the incoming sensory data from the light, sound and movement sensors. Furthermore, Mims’s program, called GLO-1 (Fig. 6), was easy to understand because it uses English terms.
SOLDER AS PROGRAM

In order to build the artwork’s electronics and install them in the sculpture downtown and at the same time develop a program for it, it was necessary to duplicate those electronics. We also needed a keyboard, monitor and small working version of the mandala in my studio to debug the circuitry and load code that Mims was writing and compiling on a mainframe. The code would read scores. Scores are what we called command sequences that would fashion the behavior of the lights. The circuitry grew and spread out in a tangle of cables, components and connecting wires on several tables in my tiny studio. It soon became apparent that the studio circuitry needed to be consolidated into a compact portable module designed for writing and testing. Thus was born the sculptural PROGMOD (Fig. 7).

With Vega’s genius, we made the PROGMOD in two parts. One part was a duplicate of the downtown circuitry. It comprised a small 9-inch mandala of 144 LEDs that represented the light globes on the 18-foot-diameter mandala of Century of Light, a duplicate radar unit, microphone and photocell. The photocell discerned day from night. We programmed the sculpture to be off during the day. I couldn’t resist adding a few extra features to the PROGMOD: We often snacked on popcorn as we worked into the single-digit hours, so I built in a popcorn popper. I added a bell we could program to ding diagnostically when some processing event happened and, for good luck, a Yin-Yang symbol that rotated under program control. Lastly, I attached a blower to inflate a three-foot-diameter blue polyethylene tube as high as 40 feet just for the hell of it. The bell, the Yin-Yang and the inflating blue tube were under program control. The popcorn popper was manually operated. Popcorn is way too essential to depend on a computer.

The other parts of the PROGMOD were the keyboard, monitor and audiocassette tape recorder/player. Five-inch floppy diskettes had made their appearance, but our microprocessor board required that programs be saved as audio files and “played” into the microprocessor. The downtown electronics didn’t have a keyboard, monitor or audio player. Therefore, we made these into a unit that could easily be disconnected from the rest of PROGMOD’s circuitry and slide out. This enabled us to create scores on PROGMOD in my studio, pull the unit, take it downtown to Century of Light and plug it into the duplicate circuitry there. We could fiddle with our scores live on the big mandala. Napping during the day, we would meet at the sculpture after dark to sit in lawn chaises and write scripts until dawn.

ART GOES DOWNTOWN

My wife, Janet, was concerned for our safety. All the news about inner-city crime and violence made her uneasy about us being on a downtown sidewalk all night. So I called the police station that patrols that precinct and handed the phone...
to her so she could hear the captain tell her that particular area was one of the safest in the city because "after dark there's no one there until the next morning." And that was our experience. Generally it was just the three of us, tweaking the scores, creating patterns, jumping up and gyrating like crazy men to stimulate the radar. Nighthawks and bats swooped down from tall buildings, attracted by the moths around the lights. A street sweeping vehicle rushing by reminded us that we were not camped in an isolated canyon wilderness.

Rene Vega remembers:

Though the streets were mostly empty, I do recall one night when several young guys (packing heat) visited us wondering what we were doing. My Detroit street sense told me we were in trouble, but then when we explained how Century of Light worked, that it would respond to sound or music and dance, it turned out to be the perfect bonding moment. One guy took his boom box (an artifact of the late 1970s), turned it on and held it near the microphone while the other guys did their twirls and hops, dancing to delight as the sculpture reacted to their movements. I often saw this bonding between the sculpture and people. It is probably the main reason the sculpture was never vandalized. The artwork responded to and rewarded people's interactions with it, as if saying "I know you, I play with you."

2 July 1980: The time came for the unveiling of Century of Light. Dusk replaced a warm day's air with the Detroit River's cool breezes and water overhead spilled from the glass canopy into the pool. The couple hundred people who gathered around the fountain were mainly family and friends of the three EMEA members, volunteer apprentices from the electrical union who worked on—and signed—the sculpture, and us. A trio of Detroit musicians, Tony Williams, Jeribu Shahid and Tani Tabal, stopped playing as the crowd gathered and quieted in anticipation. The "unveiling" was, in fact, pressing ENTER on a keyboard. This would launch the program that activated the lights on the mandala. Detroit's Mayor Coleman Young sent his aide. She pressed the key. Nothing happened, only the sound of water splashing in the pool. Mims looked at me. I froze. Vega was standing behind the mayor's aide. He said, "Pardon me," coolly reached around her and re-entered the START command.

Pop!

The waterfall stopped. The lights came on and did a special flourish. The crowd went "Ahhhh" and applauded. Everything went smoothly after that. The Harbinger Dance Company performed a 15-minute dance (Fig. 8) specially created by Connie Bergstein Dow to interact with the motion-sensing radar of the sculpture. Vega, who was a member of the troupe, had suggested to Bergstein Dow that the event

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Fig. 8. Harbinger Dance Factory performance. (© Connie Bergstein Dow) Connie Bergstein Dow brilliantly choreographed this original dance to stimulate the radar of the sculpture. The other two sensory inputs were eventually disabled. I was asked by the city to let the sculpture perform day and night, so I turned off the daylight sensor. I turned off the sound sensor when motorists learned the sculpture was sound-responsive and beeped their horns in passing, disturbing nearby residents and workers.
offered a unique opportunity for creative choreography. The event was filmed by Oscar-winning Sue Marx of Marx-Handley Productions and was incorporated into her film Jim Pallas: Electronic Sculptor. The celebration broke up around midnight.

JIM ZALEWSKI

For over 25 years, the sculpture worked amazingly well. Rene Vega's sophisticated engineering and design were simple and robust. Randy Mims's ingeniously tiny program was bug free. The last creative act was to "burn" the software into four erasable programmable read-only memory chips (EPROMS). This would enable the sculpture to start running the instant it was turned on. However, the prices I was quoted for this service were beyond our budget until a member of SEMCO told us of a kid in Hamtramck who could do it. So one night Mims and I ventured into Hamtramck, Detroit's venerable Polish enclave, and climbed rickety stairs to a modest flat. Babies crawled on the floor and a beautiful woman washed dishes in the kitchen. We met the young autodidact Jim Zalewski (Fig. 9).

Zalewski dropped out of school at 14, fell in love with video games and the previously mentioned dishwasher, learned to reverse-engineer the games and then to program them. Eventually he programmed for Atari. When he heard our story, he happily burned our EPROMS while we waited. His relationship with Century of Light continued and grew. When the city assigned the sculpture to its Building Authority, they hired Zalewski to be its caretaker. Currently, he has custody of the PROGMOD and the rest of the artwork's electronics.

THE BEGINNING OF THE END

The sculpture itself was well received. It was featured in Dennis Nawrocki's book Art in Detroit Public Places (1st ed.). The Detroit Historical Museum listed it on its tour of downtown art and valued it at quarter-million dollars. It appeared in magazines, newspapers and tourist literature. It was used as a backdrop for ads. But there was widespread dissatisfaction with the architect's treatment of the larger five-block stretch. Sporadic delays had kept the street and sidewalks torn up for four years. Parking was virtually eliminated and construction barricades and detours blocked easy access to the shops on the boulevard. In that time, almost all the street-level businesses left, either into bankruptcy or to the suburbs. The unpopular new mall opened to empty storefronts. The city had done nothing to encourage the kinds of development—restaurants, bars, theaters, boutiques and galleries—that would attract pedestrians. In fact, it converted some of the hotels to senior housing and permitted residents to park on the mall's broad walkways. Many were angered that an elegant boulevard was replaced by a bright red geometric pipe construction over a deserted pedestrian mall. "Monkey bars" became its nickname. The boulevard remained desolate. In the summer, a year after Century of Light was unveiled, I installed a program in the sculpture as an experiment. I recorded all pedestrian activity on the sidewalk in front of it for a 5-day period including a weekend. I was shocked to learn that the average number of events between 6:30 PM and 7:30 AM every day was two! This part of downtown Detroit was deserted.

By 2003 the architectural failure of the redesign of Washington Boulevard became a major issue, and the city decided to try to return the area to something resembling the original style of a European boulevard. The whole thing, including Century of Light, was slated to be demolished. I immediately informed various parties that it was a violation of the United States Visual Artists Rights Act to destroy such a work of art without first offering it back to the artist to remove at his own expense. I also offered to help find another suitable location for the piece. In the meantime, the demolition company moved the iron mandala to their yard for storage.

Unfortunately, the top administration of the city had become a corrupt operation. Mayor Kwame Kilpatrick had appointed members of his circle to city department positions. Bribery and kickbacks were rampant, budgets were looted and turnover of city personnel was constant. One observer wrote that Kilpatrick “may well be the worst and most destructive American of his generation; his two terms as Mayor of Detroit are among the most sordid and stomach-churning episodes in the storied history of American municipal corruption.” Convicted “for, essentially, running Detroit City Hall as a criminal enterprise” [2], the mayor and his father eventually were found guilty of 24 felonies and convicted of racketeering. He is serving a 28-year sentence until 2037, when he will be 67 years old.

Considering the chaos this pillaging caused within city
departments, it is understandable that despite four years of intense canvassing [3] I could not find a civil servant who was able, willing or on the job long enough to help me locate a new public site. Finally I gave up and looked for other solutions. Two Detroit suburbs expressed interest. In 2006, Mel Drumm, director of Ann Arbor Hands-On Museum, stepped forward and secured a truck to move the sculpture to a site in Ann Arbor. When I tried to arrange for the pick-up, I was informed that the private demolition contractor whom the city had asked to store the iron mandala had cleaned up his yard two months earlier. His foreman had sold it for scrap. The enemy of art is often the janitor.

SUCCESS, FROM THE LATIN SU CECEDERE—
“TO COME AFTERWARDS”
A fervent hope that a new artwork will emerge using Century of Light’s surviving elements. The loss of the massive iron mandala was unfortunate, but the essence of this artwork is the custom electronics and the code that made the scores visible. They best represent the labor and creative innovation that was the Century of Light and they remain intact. As Jim Zalewski and I became aware of the chaos in the city’s bureaucracy, we recovered all the electronics. We stashed everything in Zalewski’s garage for a few years and then moved it to a Michigan storage facility. The code and scores are backed up.

The dismantling of the mandala from its overhead canopy has opened new ideas. The placement of the mandala in the middle of a pool and its horizontal orientation atop an 18-foot-high pole were not optimal. The work could not be viewed from the best vantage, which was directly underneath. The dynamic patterns of the light mandala are much more effective when viewed head on. Mounting its plane vertically, say on the side of a building, would display the full effect of its moving patterns. Furthermore, if the mandala were attached high on a building’s facade, it could be seen from a great distance. It would be a distinctive feature in the skyline.

Now, almost 30 years later, the beauty of the light mandala itself could be improved with new illumination technology. The linear essence of the mandala would be better expressed if it were composed of 144 sets of illuminated lines instead of lighted globes. Century of Light was successful because the globes were illuminated as groups that changed, moved, dissolved and regrouped. Linear light elements would better define these groups as structures and permit more subtle interplay among them. The linear light elements could utilize LED technology, offering reduced maintenance and minuscule operating cost.

The PROGMOD is a great resource and has potential to educate the public about technological art. It should be situated in a school, museum or similar institution and utilized to give students, programmers, dancers and artists the experience of creating performances. Mims, Vega, I and, later, Zalewski took pains to make simple English the programming language of the score. This language, GLO-1, can be quickly taught to nonprogrammers. It is plain enough that even children have learned to write scores that produce light pattern behaviors responding to movements and sounds around the PROGMOD. Scores can be written, tested and modified directly on the PROGMOD itself, since it has all the features of the larger artwork. The scores can then easily be loaded to be publicly performed on the larger artwork.

Technological progress in the last 35 years, especially the Internet, remote access and interactive video, offers additional exciting possibilities to enhance the reach and impact of this historic artwork.

THE TAKEAWAY
Though this artwork has suffered an ignominious episode, it was a great personal experience. In contrast to Isamu Noguchi’s disastrous Dodge Fountain a few blocks to the south, which never worked as designed and is said to be unrepairable, Century of Light performed flawlessly for over 25 years, all day and all night, through blistering summers and bitter winters. Unlike the mall’s red “monkey bars,” the artwork itself was popular with critics and the public. The PROGMOD and a 3D model of the mandala were exhibited at Everson Museum in Syracuse, New York, in 1987, the IBM Gallery of Science and Art in Manhattan in 1988 and the Contemporary Art Center in Cincinnati, Ohio, in 1988 as part of Cynthia Goodman’s Computers and Art exhibit. It then spent years on display at the Ann Arbor Hands-On Museum. The Marx-Handley film won awards, including an Emmy and a CINE Golden Eagle. The three young musicians who performed at the unveiling went on to earn acclaim in the jazz world.

The enthusiasm of the volunteer electrical apprentices who assembled and wired the fixtures, the thrill of inspiring choreography from a creative modern dance troupe, freely collaborating with a polymath like Rene Vega and experiencing the patience pedagogy and elegant style of Randy Mims as we dissolved impediments and explored possibilities—experiences like these are the real rewards in the life of an artist. My relationship with Jim Zalewski deepened into a friendship that continues to this day. We have collaborated on several major sculptures, including Nose Wazoo [4], LAW [5] and The Legacy of Fagel and Yishiah [6]. This project invigorated me and prepared me for a greater adventure the following year, The Senate Piece [7].

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