Body Scans a Big Step in Replacing Courthouse Sculpture

David Bassett and Lisa Federici spend two nights taking 3-D restoration images of The Spirit of the Ocean fountain

The Spirit of the Ocean, Santa Barbara's iconic and apparently robust fountain created in 1927, has been crumbling for decades and is on the verge of collapse. (David Petry photo)

By David Petry, Noozhawk Contributor | Published on 02.25.2010

The two sandstone figures — a nude male and female divided by a fish — who keep watch out in front of the Santa Barbara Courthouse lead troubled lives. One might think, given the detailed body scans they received on Monday and Tuesday, that they had turned to crime.

The scanners on the scene were David Bassett and Lisa Federici, CTO and CEO respectively of Scansite, a firm that does art restoration scans. Bassett and Federici travel the world evaluating the health of many such figures — clothed, draped or nude.

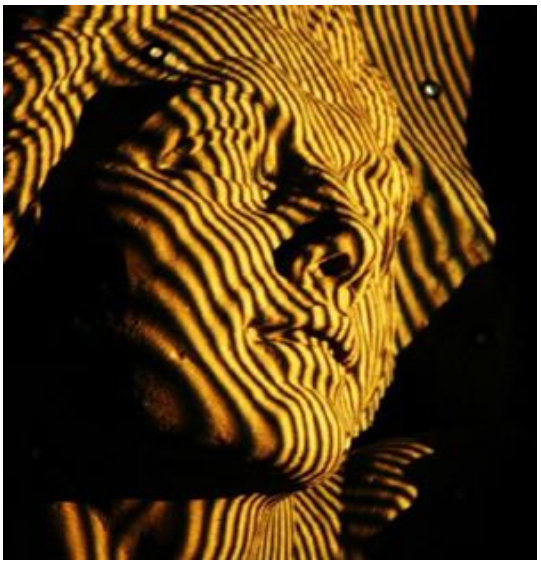
"It's good we're doing this now," Federici said. "Another year and this may not even be here."

Federici was lightly placing sticky registry dots onto the sculpture Monday before the scans started, and the slight pressure to stick one on created a 3 inch wide divot in the stone.

The Spirit of the Ocean, Santa Barbara's iconic and seemingly robust fountain, has been crumbling for decades and is on the verge of collapse. The chosen remedy, after years of discussions and planning, is to replace the sculpture. The money for the project is accumulating. The process determined. The sculptor selected. The stone found.

(I've written extensively about the history of the sculpture, the project and the sculptors involved, and have provided links at the end of this piece for the related articles.)

The next big step in the replacement process was to obtain a three-dimensional scan of the existing sculpture, and Federici and Bassett were in town to complete that step.



The bands of light are read by the scanning device to establish points in space.

(David Petry photo)

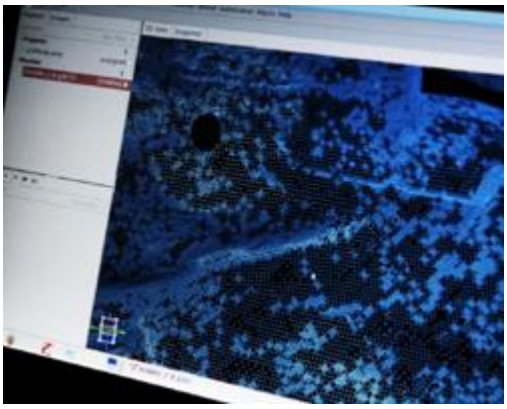
"It creates a model the sculptor can use to create the replacement, but it also creates a record for the county," Bassett said. He talks while operating the scanner and monitoring the buildup of overlapping scans in the software.

The scanning process creates a 3-D point cloud or polychrome of the surface in the modeling software. The task, finished Tuesday night an hour before midnight, required two late evenings. Bassett and Federici placed evenly spaced registry dots on the sculpture and then proceeded to scan, section by section, the entire accessible surface of the sculpture. They performed about 30 scans, each taking 10 to 15 minutes.

The successive images Bassett shoots are lined up in the software with the registry dots. "We start in the center and work out," he said.

Bassett sets up the next scan, the light from the scanner providing markers for the corners and center of the target scan directly on the sculpture.

"It reduces the margin of error as you move outwards," he said.



A partial point cloud for The Spirit of the Ocean.

(David Petry photo)

Essentially, the greater distance one scan is from another, the greater chance that slight errors will accumulate into misrepresentations in the final composite image. Starting at one corner on the Spirit of the Ocean places the far opposite corner up to six scans away. The same corner is just three scans from the center.

Sculptors have turned to technology to simplify and clarify their tasks for centuries. In a recent article on the Spirit project, I described the sculptor's pointing machine invented in the 1750s that allows a sculptor to build a small clay model, and with the pointing machine (and typically using apprentices), create a larger version in stone or bronze.

The scanner Bassett and Federici employ is a modern, more accurate and far less cumbersome pointing machine. Before digital scanning, X-rays were used with some success, but were more limited to evaluating a sculpture's integrity. One of the first uses of X-rays to evaluate a sculpture gained world press in 1964. I found the event had a family connection.

My mother-in-law, Carol Hauer, neé Corney, remembered the 1964 New York World's Fair both because she went with her children and because of her Uncle George.

"Uncle George X-rayed Michelangelo's Pieta," she said. "The Vatican gave permission for the World's Fair to ship the Pieta to New York, but they asked that the sculpture be X-rayed before and after the trip to make sure nothing happened to it."

Uncle George was physicist George M. Corney, employed by Eastman-Kodak. He made global front-page news in April 1964 when his team released X-ray images showing that the Madonna's hand had been broken some 100 years earlier and then repaired.

"He sent us a copy of the X-ray of her head," Hauer recalled. "It was beautiful."

At the fair, my mother-in-law recalled being disappointed. "You could only see (the Pieta) from a conveyor belt that moved a line of people past it," she said.

The male nymph's abdomen from The Spirit of the Ocean shows the registry dots, the seam between two sandstone blocks and evidence of surface decay.

(David Petry photo)

According to the papers, there were three moving walkways available at three levels, and a fourth, "a walkway for those who wish to view the sculpture at their own pace." For convenience, it was unmatched for the times; at least one patron bragged of being able to see it on her way to a Mets game with her son.

Permission to send the sculpture to the World's Fair had been granted by Pope John XXIII. It was the first time any Vatican artwork had been shipped for public viewing. In certain terms, the trip was a success. More than a million people viewed the sculpture during its visit. But Romans were not happy. A year after its return, Pope John in his grave, Pope Paul issued a decree stating that banned any future loans of Vatican artwork.

The Pieta serves as a telling example of the spectrum of stresses we place on masterpieces. We want them shared and seen, and in the case of great public fountains such as The Spirit of the Ocean, even touchable. Exempt from any future trips off Vatican property, the Pieta wasn't finished, serving as an example.

In 1972, Lazlo Toth, a Hungarian-born Australian geologist, leaped over the rope barriers surrounding the statue and delivered 15 blows with his geologist's hammer before he was restrained. He removed the Virgin's arm at the elbow, chunked away part of her nose and chipped an eyelid. He shouted at the time, "I am Jesus Christ, risen from the dead."

Toth was never indicted. He spent a couple of years in a mental institution in Italy and then was deported to Australia. According to Wikipedia, Toth, born in 1940, resides in a nursing home in Strathfield, New South Wales, Australia.

Forty-four years after my mother-in-law visited the Pieta at the New York World's Fair, my wife and stepdaughter visited the piece at the Vatican. She echoed her mother's disappointment of the sculpture's presentation because it now resides behind a dense wall of bullet-proof glass. "It was like looking through a thick pair of someone else's glasses," my wife said.

One way around that is to create replicas of great masterpieces.

“They used to do molds to create replicas,” Bassett said. “But you can’t do that anymore because you’re impacting the surface of the original in some way.”

This is what Forest Lawn Memorial Park in Glendale did with Michelangelo’s David. In June 1939, the cemetery unveiled a full-sized replica of the statue, bringing the masterpiece to American masses for the first time. That statue was toppled and shattered in the 1971 Sylmar earthquake, and was duly replaced. If that happens again, they could scan the original and create an even closer replication.

But such scans are not just done. You need papal permission.

According to Bassett, in recent years, the Vatican gave permission for one agency to replicate the Pieta. Twelve copies were to be allowed. To date, seven have been made. One of the copies, a bronze valued at $12 million sits in a remote barn in Oregon. Bassett and Federici know because they were brought in to scan it.

Scansite is the only company they know of using the high-end equipment they use for art restorations. The device they use is a $200,000 unit built by GOM in Germany.

“We attend the user conferences occasionally, and the companies there are Northrup, Boeing, Honda...,” Bassett said. The company Web site lists every automotive and aeronautic company I could think of.

“They’re scanning every thousandth unit and validating it against the original model,” he said. “They’re scanning entire 747s.” Such scans verify everything is where it’s supposed to be with an extremely low margin of error.

Scanning a 747, it turns out, is easier than scanning a sculpture the size of a Hummer, such as The Spirit of the Ocean. The registry dots they stick to the 747’s fuselage have more information on them, allowing a special camera to snap away quickly. The scanner is then run over much larger areas; the software uses the camera registry dots to line up the scanned image.

Scansite also performed the scans for the highly detailed bronze doorways of Our Lady of the Angels in Los Angeles.

(David Petry photo)

In art restoration, detailed scanning and computer numeric control (CNC) mills have also almost completely replaced pointing and other methods as artists now develop small models in clay or wax, scan the finished item and have it cut out in foam by a mill. The foam model is used to create a full-sized plaster cast, which in turn is used to cast the full-sized item in bronze in a forge. Scansite performed the scans for the highly detailed bronze doorways of Our Lady of the Angels in Los Angeles, working from small models provided by the artist.

On another job, one of four statues on King Ferdinand of Spain's tomb had been sold by the Spanish government in a period of economic strife. Eventually, the statue ended up at the British National Museum and Spain wanted to get it back. The museum declined to return it, but it allowed Spain to scan the statue and build a full-sized replica, which now stands in its proper place on the tomb.

Bassett flips through Scansite's dossier of projects maintained in a large binder. "Sometimes museums want us to scan a masterpiece so they can create scale replicas in plaster for their gift shops," he said.

County architect Robert Ooley has been nursing along this and several projects at the courthouse for several years.

"We want the public involved," he said. "So much restoration work happens behind the scenes, and then one day it's just there and no one knows what happened — or how."

A large portion of The Spirit of the Ocean replacement will happen in the public eye — not the whole process, but an unprecedented amount.

David Bassett scans a section of the sculpture in the dark of night. Bassett and Lisa Federici performed about 30 scans, each scan taking 10 to 15 minutes.

(David Petry photo)

The scan wasn't conducted in the dead of night to hide the process. Dark is just the obvious and best time to gather data that relies on controlled light sources. A plywood platform was built for the scanner equipment and personnel. The protective plastic sheet that has shielded the sculpture from this season's weather was removed. Several palm-sized shards from the dolphin-fish head, knocked off by a child climbing on the statue in June, were set aside.

Bassett expects up to 10 days of further manipulation of the scanned images in the software. He traverses the images “patch by patch, spline by spline,” ensuring a file that can be used as both an archival record of the sculpture and as the basis for creating a new model for the sculptors to work from.

For The Spirit of the Ocean, the process isn’t simple. The massive piece will be broken down into the four component blocks of the original sculpture. On each of these blocks, there are numerous surface defects on the sculpture because of excessive stone rot and weathering that must be fixed. Then there are the effects of decades of patching and shaping on the surface to correct earlier defects. Combined, these have made the existing sculpture larger and heavier — and substantively different — than the original.

Scansite’s target with the project is to provide an image as close to the original sculpture as possible. One version of the file will go on record with the county for future reference. One will be sent to Satellite Models of Belmont. Satellite will take the scan file, feed it into a CNC milling machine, load the machine with appropriate-sized foam blanks and set the machine in motion.

The resulting carved foam is not perfect. To reach the level of detail retained in the scan file and on the original sculpture, smaller and smaller cutting tools would have to be used — akin to using finer and finer grit sandpapers on a wood piece. Each step to achieve greater detail takes time and money, and sculptors have learned this is not the place to gain the required level of perfection. Instead, the sculptor, who in this case is English-trained sculptor Nick Blantern, tools the foam model directly, working in conjunction with Scansite and a sculpture restoration expert to get the foam model exactly right.

Once the model is perfected, Blantern will begin using the old-fashioned pointing method to carve four large blanks of stone into something close to the original. At some point, when the levels of noise, dust and accuracy are deemed appropriate for public display, the partially carved stones will be moved to the courthouse lawn, out in front of the existing sculpture, where the work will be finished.

The scanned image begins to take shape.

(David Petry photo)

Gabe, the courthouse night watchman, wanders into the small halo of light around the fountain where Scansite is working.

“I’m so glad to see this getting done,” he said. “The last architect here didn’t spend a lot of time on the courthouse. (Ooley’s team) is just finishing the ceiling in the mural room” damaged by smoke during a recent fire at the courthouse, “and they’re starting to get all these light fixtures working again. Some of them, they can’t even figure out where the electrical for them is. Some, they put in a new light bulb and they work.”

Another David Bassett surfaced in the news last year in relation to 3-D scanning. Bassett is the Transportation Security Administration security director at Denver International Airport. In his role, he was introducing the first full-body scans at airport security checkpoints in the country. The technology is a cross between X-rays and scanners, converting human beings to point clouds and polychromes — and giving security officers a snapshot of our obesity epidemic.

The two models for The Spirit of the Ocean posed nude for three hours a day, three days a week over a period of six months in 1927. Paid 50 cents an hour at first, their sitting fee was raised to 75 cents when the family learned that sculptor Cadorin was being paid about $5,000 to complete the piece.

If the sculpture was being launched from scratch today, those models might be scanned, expanded 20 percent or so in size, cut in foam and then carved in sandstone. Or maybe cast in bronze. A bronze would have lasted a lot longer and would have removed any need at all for this process.

But we have what we have, and you won’t find me — or most Santa Barbarans I’ve talked to — saying it is anything but a gift.

— Noozhawk contributor David Petry is a local historian, author and photographer.