IEEE SPECTRUM

23 Feb 2018 | 16:00 GMT

Ancient Sculptures Return to Mosul as Digitally Reconstructed Replicas

Submillimeter 3D scanning produces precise copies of Assyrian statues

By Michael Dumiak

Photo: Factum Foundation for Digital Technology in Conservation**Hold Still:** Artists scan a lamassu at night in the British Museum.

The Iraqi city of Mosul is still recovering from its brutal occupation by the Islamic State. The city suffered devastating bloodshed during that time, and many archaic statues and artifacts were destroyed by militants and vandals. Raising the city from the rubble will be rough work. In at least a couple of instances, though, resurrecting a piece of the ancient past will come courtesy of a 3D scanner.

Later this month, two ultradetailed facsimiles of the massive stone statues known as lamassu, protective spirits that date back nearly 3,000 years to the Assyrian empire, will begin a journey from the Netherlands to take up permanent residence in Mosul. As

products of the digital age, their journey poses questions about authenticity and where objects belong.

These new spirits are copies of two lamassu originally excavated by a British archaeological expedition in the mid-19th century. While charting Mesopotamia, the group uncovered a field of artifacts that had been buried for 2,700 years.

The lamassu they found there—imposing winged statues—once stood guard along the walls surrounding the ancient city of Nineveh, near what is now Mosul. The excavators brought two of the statues back to London.

In 2004, the art historian Adam Lowe set out to record these statues at 300-micrometer resolution in order to produce copies of them for a traveling exhibition. Lowe heads Factum Arte, an art studio that has made a stir by casting precise facsimiles of antiquities.

For five weeks, Lowe and his team spent every evening at the British Museum scanning the lamassu and relief panels and shards. For the lamassu, they used a white-light scanner built by the company NUB3D.

The studio mounted its scanners to a tripod close to each lamassu. The scanners projected parallel lines on the surface. A sensor measured the deformation that appeared in the lines as they moved slowly over the 4-□meter-tall sculptures, generating a cloud of millions of data points along the *x*, *y*, and *z* axes.

Factum Arte's work with these lamassu remains among the highest-resolution 3D scans ever of objects that size. But the traveling exhibition they were intended for was derailed by financing shortfalls and the escalating Iraq war.

The replicas were never cast, but the data from the scans remained. Then, four years ago, curator Lucas Petit of the National Museum of Antiquities, in the Netherlands, began organizing a marquee exhibition about Nineveh. He wanted the facsimiles to be its touchstone pieces.

Photos, from top: Factum Foundation for Digital Technology in Conservation (2); Robbert-Jan Looman/Dutch National Museum of Antiquities

Past to Present: Adam Lowe of Factum Arte matches the color of a replica to that of an original lamassu [top, middle]. Two replicas now stand in an exhibition ending this month in the Netherlands [bottom].

Petit contacted Lowe, and work finally resumed in 2016. Factum Arte used the data from the old scans to control a milling machine that carved a dense polyurethane solid into the shape of each lamassu. The studio then used these models to make silicon molds in sections for the sculptures.

Using color swatches and close-up images, Lowe painstakingly matched the pigment colors to the original Assyrian gypsum. Factum Arte's Sebas Beyro mixed the pigments into *scagliola*, a kind of tinted plaster dough, which he pressed into silicon molds to create the facsimiles.

As the Nineveh exhibit opened last October, Lowe, Petit, and officials at the British Museum—which holds the copyright for the facsimiles—began talking with antiquities authorities in Iraq. During the Mosul occupation, the Islamic State made a spectacle of smashing Assyrian artifacts. With the Islamic State now gone from Mosul, the exhibit's organizers decided to send the replicas of the lamassu to Iraq. (The British Museum will hold on to the originals.)

Faisal Jeber, director of the Gilgamesh Center for Antiquities and Heritage Protection, is eager for the facsimiles to arrive. "Lamassu have become an icon of the Mosul resurrection post-ISIS," he says.

Having fled Mosul the week after the occupation began, Jeber returned in late 2017 with a militia battling to take the city back from the Islamic State. The city's east bank is slowly returning to normal, he says, while the west bank, which is still 60 to 80 percent destroyed, tries to reinstate basic services, such as water and electricity.

The University of Mosul's director of Assyrian studies, Ali Y. Aljuboori, says he will have mixed feelings when the facsimiles arrive. "I'll be excited. There are no complete figures left in Mosul now," Aljuboori says. "But the spirit of the Assyrian artists who made the originals? That we have lost forever."

This article appears in the March 2018 print magazine as "Ancient Statues, Digitally Reconstructed, Return to Mosul."