

Case Study

HP 3D Structured Light Scanner Pro S3 with Dual Camera Enables Archaeologists to Accurately Measure and Create Models of Prehistoric Artifacts



Deploying the HP 3D Scanner into the prehistoric artifact analysis workflow enables archaeologists to measure artifacts in detail and share the digital data with the accuracy, speed, and reliability they have never experienced before

Industry

- Archaeology

Approach

- Obtain precise measurements of prehistoric artifacts with the HP 3D Structured Light 3D Scanner with Dual Camera and create 3D-digital models for further observation and interaction

Challenge

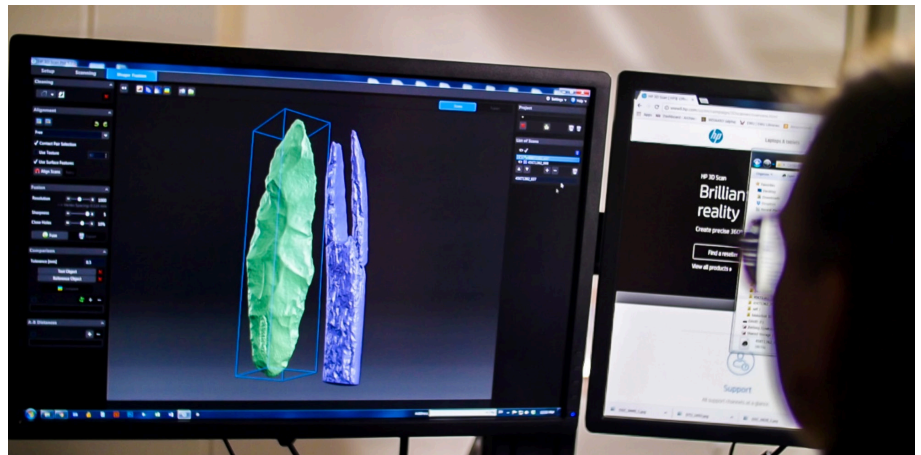
- Irregularly-shaped, delicate, and irreplaceable artifacts cannot be measured accurately using traditional manual methods
- Archaeological artifacts are fragile, limiting researchers' ability to handle and interact with them for further study
- Data sharing among researchers and students is hampered by geographic distance, and the public cannot directly interact with archaeological artifacts

Solution

- Incorporate HP 3D Structured Light Scanning into the artifact analysis workflow
- Get precise, reliable, and reproducible measurements of artifacts using the HP 3D Structured Light Scanner Pro S3
- Use the data to correctly determine the type, age, and nature of the artifact
- Assemble a dataset that can be compared and shared with other researchers

Results

- Every part of the artifact can be measured precisely and accurately
- 3D scans can be manipulated virtually in the software, to better understand the artifacts
- Artifacts can be 3D-printed to create lifelike models that can be handled and studied
- Data and 3D models are shared with other researchers, students, and the public to advance research and enhance education



“If more archaeologists adopted 3D scanning then we would be able to greatly increase the dataset. And that would allow us to interact better with the public and even each other.”

- Julia Furlong, Archaeologist, Archaeological and Historical Services, Eastern Washington University

Archaeological artifacts offer glimpses of our past, but they are often enigmatic. Since using the HP 3D Structured Light Scanner Pro S3 with Dual Camera, the Archaeological and Historical Services of Eastern Washington University has been able to unlock some of the mysteries of the past more easily. They use the HP 3D Scanner to get precise measurements of a prehistoric artifact antler foreshaft and projectile point and generate 3D digital models. Not only can they take precise measurements, they are also able to make life-like models that they can safely manipulate for further study by 3D printing the digital 3D scan files. And because the data is digital, the knowledge is easy to share with other researchers.



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“We are finding ourselves faced with many opportunities that we didn’t have before. It’s going to open up research opportunities for people who can’t come and access collections physically but they will be able to do so online. And, again, the accuracy involved is greatly increased over what we could ascertain from published reports and tabulated data.”

- Stanley Gough, Director of Archaeological and Historical Services, Eastern Washington University

Challenge

HP 3D scanner unlocks the secrets of the past

Measuring archaeological artifacts by hand is time-consuming and prone to inaccuracies and inconsistencies. The quality of measurements taken with calipers depends on the skill of the one measuring. And because artifacts are often oddly shaped, there has been no hard-and-fast way of measuring them that’s reliable and reproducible.

It’s also been difficult to represent artifacts precisely. Hand-drawn illustrations take time, and even photography has its limitations. “There are some ways of illustrating artifacts that you can’t capture with basic photography,” Julia explains.

Furthermore, archaeological artifacts are extremely old and fragile. They hypothesized that the projectile point fits into the foreshaft and the two pieces were used together. But researchers can’t always test their hypotheses about how objects fit together or were used, since some objects are too delicate to be handled. And so artifacts remain difficult to fully grasp. They’re even more unfathomable to the general public, who, at best, can only look at them through glass.

Solution

Accurate measurement and modeling increase understanding

The HP 3D Structured Light Scanner Pro S3 with Dual Camera revolutionizes how the Archaeological and Historical Services of Eastern Washington University records and analyzes artifacts. The 3D scanner’s turntable accommodates objects of any shape and size. It turns automatically, allowing the high-definition 3D scanner to measure and capture every angle of the artifact. Within about 10 minutes, the software has a digitized rendering of the object.

The level of detail and precision is a far cry from the time-consuming, inaccurate, and incomplete manual measurements of the past.

Julia and her colleagues can then manipulate the object virtually through the software. But they go beyond that. They print the artifacts on

a 3D printer to produce faithful models they can handle and manipulate as much as necessary for their research—unlike the original artifacts, which must be handled with utmost care. “Being able to 3D scan and reproduce models of artifacts really aids in teaching both for the public, letting them know about more about what we do and what we find in archaeological digs, and through teaching aids for students at the university,” Julia says. “Now they can hold these objects in their hand and interact with them in the way they were meant to be.”

Results

Breaking barriers to a more immersive experience of the past

The HP 3D Structured Light Scanner Pro S3 makes studying relics of the past a more immersive experience. No matter the size and shape of the artifacts, their exact measurements are obtained. Time-consuming, inaccurate, and inconsistent manual measurements are now a thing of the past. Screenshots and 3D renditions provide richer documentation than illustrations and photographs. It increases the understanding of how tools were created and used.

“The increased accuracy that we get with 3D scanning over the old way of doing it, manually with calipers, was primarily gained in eliminating the errors that come into play when you have different analysts trying to measure oddly shaped geometrics. We can now take measurement at any point on the artifact,” Stan declares.

The digital data are easily compiled into a dataset that can be shared with other researchers all over the globe. This opens up Eastern Washington University’s research to other academics. This accelerated exchange of data facilitates discovery and understanding.

Most exciting of all is the ability to create replicas of the precious, delicate artifacts. Unlike the originals, these replicas can be reproduced as needed and handled by anyone. This makes archaeology, as well as our past, more accessible to researchers, students, and the public. We can now directly experience and interact with replicas of objects from our prehistoric past.

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