Artec 3D

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3D SCANNING WITH ARTEC EVA FOR STATE-OF-THE-ART MARINE ANIMAL TRACKING

Swansea University uses Artec's 3D scanning technology to create customized tags for marine animals to monitor their behavior for marine biology research.

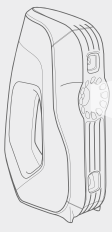
Artec's 3D scanning solutions were used in a marine biology project led by Lloyd Hopkins, a Ph.D. student at the University of Swansea. Using a portable Artec Eva 3D scanner with professional CAD software, Lloyd found an innovative approach to creating customized tags for various marine animals.

Swansea University's Lab for Animal Movement (SLAM) researches marine animal life using state-of-the-art tagging technology and leading data visualization techniques. This is done to understand more about marine animal life in the depths of the ocean. Data gathered from these tags, including speed and activity levels, provides detailed information on migration patterns of the sea creatures and the effects that ocean temperatures have on their behavior. Working with other institutions and groups, Lloyd's research focuses on developing innovative methods for attaching these tags in a non-invasive way, so that they won't fall off, or cause any distress to the animals.

To develop a new attachment method and simulate their effects, accurate measurements of each animal's shape and structure were required.

TOOLS USED

Artec Eva
Artec Studio 12



THE GOAL

Use the Artec Eva handheld 3D scanner for capturing marine animals such as sharks, dolphins, and turtles to get accurate measurement data needed for development and 3D printing of customized tags.

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Large loggerhead turtle

3D scan of a large loggerhead turtle

Lloyd needed a professional 3D scanner that would quickly and safely 3D scan the sea creatures, and 3D software that would allow him and his team create customized tags. They chose Artec's most popular 3D scanner, Artec Eva, together with Artec Studio 12 software. Artec's gold-certified reseller, Central Scanning Limited, provided the training and consultancy to Lloyd and his team.

"We're pretty confident here that use of 3D scanning techniques will be widely adopted as standard in the future for this type of research." Lloyd Hopkins.

Lloyd states that 3D scanning is the optimal way of capturing large animals and obtaining data that can easily be examined and studied. Without this important technology, they would have to rely on estimated data that might not translate properly to a real-world application.

"Once we had decided on 3D scanning as a method, the Artec brand stood out quite quickly due to its usability, its functionality, and its fantastically powerful software that did most of the hard work for us." Lloyd Hopkins.

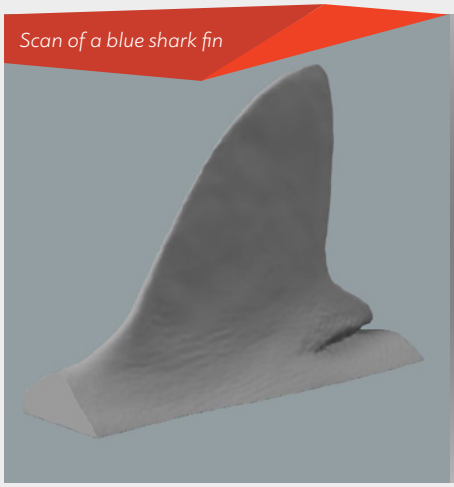
Lloyd used an Artec Eva 3D scanner to capture 3D data from deceased and living marine animals, and it only took a few days to get the needed measurement information, making the use of 3D scanning incredibly time-effective and remarkably easy considering that capturing wet, shiny and moving animals would be challenging for most 3D scanners!

The workflow of the project started with Lloyd making high-quality scans of various marine animals. Some of the animals were already deceased and kept in the storage. For example, a shark that Lloyd scanned had a bent fin, due to its storage in a compact freezer. This, however, wasn't a problem, as he was able to capture a series of measurements of the fin and simply rebuild the model.

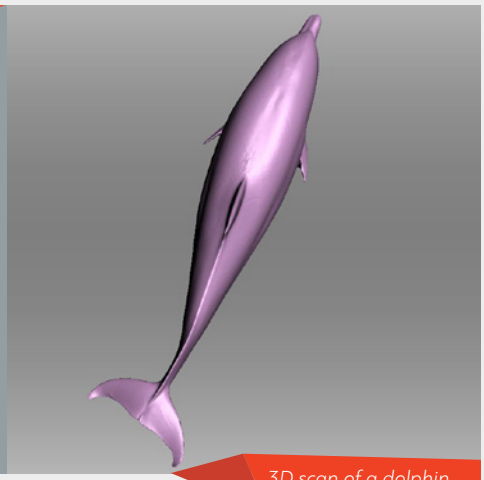
But some of the 3D scanned animals were very much alive! When capturing the live dolphin, for example, trainers encouraged this intelligent animal over to the side of the pool, where Lloyd quickly scanned its fins. It was enough to get one side captured and then stitch it together in Artec Studio 12 software.

CREATING THE FINAL 3D TAG MODEL INVOLVED THE FOLLOWING STEPS:

- The scan data was used to build the design around the scanned animal. Using Autocad Fusion 360, Lloyd created the tag around the scans, and rebuilt a fin from the gathered measurements. He then used Meshmixer to modify the mesh, e.g., smooth over scan stitching lines and correct difficult-to-scan areas such as the dolphin's mouth.
- With a tag shaped to fit the animal, it was ready for printing and testing. The finished product was instantly better in size compared to those created using hand measurements.



Scan of a blue shark fin



3D scan of a dolphin

Lloyd and his team obtained all the data they needed in little time. Though research for the project continues, 3D scans of the animals have attracted attention from trainers and vets in Spain. Impressed with the possibilities of 3D scanning, animal experts say it would save them significant time when monitoring growth and or taking measurements during animal autopsies.