



# Archaeologists Use a Drone to Map a Dig

ArcGIS® Helps in the Discovery of an Ancient Untold Story

At Sweden's Kalmar County Museum, archaeologists are using ArcGIS® technology from Esri® to unearth a moment frozen in time. The museum's team recently flew a 3D Robotics drone over the Sandby Borg ring fort, a refuge during the fifth century on the Swedish island of Öland. Prior research revealed that the site contained many large gilded brooches and other valuable items. The team wanted to learn why all of this was left behind.

Archaeologists quickly processed the drone-captured aerial imagery using Esri's Drone2Map™ for ArcGIS. The app streamlines the creation of imagery products for visualization and analysis in ArcGIS. Using Drone2Map, the museum's archaeologists were able to create a high-resolution basemap and elevation surface in just one day.

The Sandby Borg basemap allowed the team to see traces of house foundations within the fort. Next, archaeologists excavated one of the dwellings. They documented the excavation with daily drone flights over the site. Image data was processed using Drone2Map.

The team also used Collector for ArcGIS to document the artifacts, which included food remains—a pile of lamb bones and fish skeletons. It seemed the fort was suddenly deserted, with meals left unfinished. Workers then uncovered six complete human skeletons, which were later determined to have died violent deaths.

Through years of excavation—and with the help of a dog that can locate ancient human bones—archaeologists learned that, around 480 AD, Sandby Borg was the site of a terrifying massacre. No one ever returned. The bodies were never buried. The houses were never looted, and the site was left untouched for 1,500 years.

Using the drone imagery and ArcGIS 3D capabilities, the team digitally reconstructed the fort including the houses, grass roofs, and defensive wall. Kalmar County Museum has embedded web maps and a 3D web scene on the Sandby Borg website so that visitors can interactively explore the site and follow the excavation project as it advances.

"Going digital is a huge leap for archaeology," said Fredrik Gunnarsson, an archaeologist with Kalmar County Museum. "Esri's technology reduces our workflow, saving us three hours per person per day. It changes how research is being conducted and how findings are reported. Archaeologists can now dig, document, and make their results available in real time."



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