

# Acoustic Imaging Reveals Lost Town

Off the coast of the Dunwich in Suffolk lies half a medieval town long abandoned to the sea. Despite many diver and sonar surveys, details of the site have been hidden due to poor visibility. In June 2010, however, acoustic imaging technology was introduced to complete an archaeological survey of the site.

The site of the sunken town of Dunwich has been the subject of debate for several centuries. What remains of the ancient capital of East Anglia off the coast has been the subject of countless diving and archaeology projects. Since the 1300s, historic buildings have been lost to the relentless encroachment of the North Sea.

Attempts to gain any detailed view of what lies beneath the water, the silt and the sand off the coast have been hampered by the poor visibility near the seabed, however. Tidal and wave currents keep fine sediments from the seabed in suspension, causing the very poor visibility. This is a particular problem off Dunwich because the site is dispersed over the seabed and many of the remains are fragmentary. Conventional optical systems generate blank screens in such conditions, so the investigators have turned to sonar imaging as an alternative.

Modern side-scan sonar and multi-beam echo sounders have located and visualised the site; resolution is limited, however, and the images lack the detail needed to differentiate carved stonework or building materials from naturally occurring geological formations. Diver survey is still required to identify targets where the remains are not discrete wrecks.

In June 2010, a team working with the BBC and MacArtney Underwater Technology employed new technology to examine the Dunwich site. Marine Archaeology Professor David Sear (University of Southampton's School of Geography) teamed up with divers including Andy Rose (from the diving instructor company Learn Scuba based in Lowestoft) and sonar imaging expert Mike Sawkins (MacArtney Underwater Technology Group). The team deployed a special sonar camera, the diver-held (or DH) DIDSON.

Each diver clipped onto a shot line which had been previously positioned over the ruins using GPS navigation and side-scan sonar data. The divers could then undertake circular sweeps of the sea bed around the shot line, gradually increasing their radius of survey. A set of data were acquired at a distance of 8-15 metres, and a second set for close-up visualisation at 1-5 metres.

The combination of high frequencies, acoustic lenses and very narrow beams increased the image detail and gave archaeologists greater information about the site than ever before available. "The DIDSON diver-held system enabled us to see for the first time the worked and rubble masonry on the seabed from the ruins of St Katherine's Chapel and St Nicholas Church, which were lost to the sea around 1550 and 1480", said Sear.

Recent surveys of the coastline of the UK have highlighted the extent of non-wreck marine archaeology associated with buildings and settlements that are currently unprotected by law and largely unexplored. Such areas are often subject to development and, as such, require effective techniques for assessing heritage and archaeology as part of development control and planning.

This field trial, which was the first-ever use of the DIDSON imaging system for non-wreck marine archaeology, could change the way archaeologists examine offshore sites where visibility is low, especially where the coastline is silted by rivers or eroded away by the sea.

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