

# Underwater Surveys and Remote Sensing – The 2005 Corinthian Gulf Expedition

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## ABSTRACT

*In mid-May to mid-June of 2005, a team of scientists aims to conduct an important underwater archaeological survey in the NE Corinthian Gulf utilizing the latest in remote sensing technology and data processing capabilities. This large scale survey will be a collaborative effort between the Institute of Nautical Archaeology, Texas A&M University, the University of Birmingham (U.K.), the British School of Athens, the Hellenic Centre for Marine Research and several Archaeological Ephorates of the Greek State including the Ephorate of Underwater Antiquities. The goal of the survey is to bring to light the underwater cultural heritage of this important and unexplored area of the country so that it may be protected and studied. In addition, through undertaking such significant surveys, the field of underwater archaeology in Greece will be promoted and it is hoped that the general public will take note of the importance of protecting the country's underwater archaeological treasures.*

## METHODOLOGICAL APPROACHES

A mosaic of civilizations and cultures throughout the centuries has inhabited the Corinthian Gulf region of Greece, leaving behind plenty of evidence of their stay. Recorded history begins well before 1500 BC and continues through subsequent Greek, Roman, Byzantine, Frankish and Ottoman times. The potential for an underwater archaeological survey is notable as the area is littered with submerged structures (Picture 1) and has also yielded an impressive bronze statue of Poseidon, now in the National Archaeological Museum in Athens (Picture 2). Towers and fortifications guard the entrances to the natural harbors (Picture 3), while prominent city states of antiquity and later lay nearby. What we know, however, ends with the coastline; anything deeper remains completely unexplored.

The team undertaking the underwater survey will be composed of archaeologists and nautical archaeologists from various Universities and Institutes in the United States of America and Europe. They will conduct visual surveys, verify targets located with remote-sensing techniques, and will also digitally map a series of submerged structures located along the coastline using a digital total station. Any targets that lay in waters deeper than 30 m will be explored using a remotely operated vehicle (ROV).

In addition to the archaeologists, two research vessels carrying the latest in remote-sensing technology, as well as an (ROV), will be supplied by RPM Nautical Foundation. The first, the R/V Hercules, is a 37,3 m long vessel that is specifically designed for conducting underwater archaeological research. It is intended to act as a self-sufficient base of operations, housing crew and scientists, and capable of deploying its ROV, remote sensing equipment (both an extremely sophisticated multi-beam system and side-scan sonar), as well as hosting diving operations. The vessel is also equipped with a positioning system which utilizes a dedicated satellite and advanced data processing capabilities. It carries a tender which can act as a dive-boat and carries its own global positioning system.

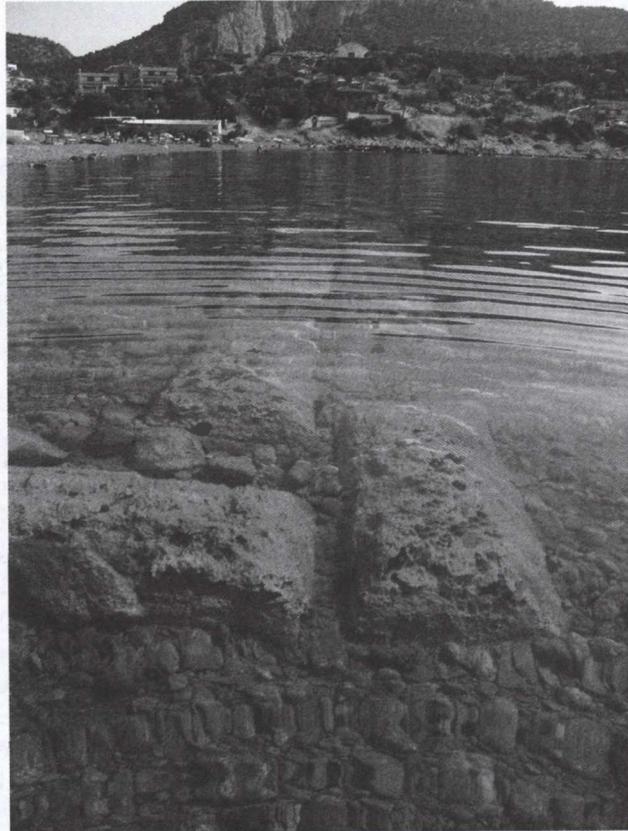
The second research vessel to be used is the R/V Juno. At 8,2 m long it is very capable at near-shore surveying, complementing the Hercules' open-water capabilities. It too is equipped with a sophisticated shallow-water multi-beam system as well as three cesium magnetometers. The vessel also carries a dynamic positioning system (DGPS) which is able to accurately locate the R/V Juno in real-time within a meter.

The methodology utilized for surveying the region will be threefold. The R/V Hercules will cover the majority of the survey area, three-dimensionally mapping the sea-floor using the onboard multi-beam system. In depths greater than 130m, side-scan sonar will instead be used as the primary tool for surveying. Meanwhile, the R/V Juno will proceed to survey the shallower waters (40 m and less) using its own multi-beam system. Divers will act in the fashion described above, exploring areas near the coast where data from remote sensing equipment is not as effective in distinguishing artifacts from their surroundings. If targets of interest appear through any of these means subsequent examination will follow either through magnetometer surveying, further dives, or the ROV. The aim is to retrieve as much information as possible from any potential sites without disturbing them.

Underwater remote-sensing technology, discussed in detail in the paper, allows for this aim to be completed efficiently and accurately. Large areas that previously took weeks to investigate can now be covered in a matter of days. Within certain parameters, the entire bottom may be mapped three-dimensionally, allowing for the archaeologist to have a representation of a site before personally investigating it. Also, one may now survey in deeper waters allowing for the possibility of untouched new sites to be discovered. The inaccessibility of deeper waters, as well as the more benevolent

physical environment, promote a better state of preservation for these sites. This technology, however, is not without its weaknesses; the strengths and weaknesses of each piece of equipment must be clearly understood prior to use. Often surveys are very limited in their duration and may not be repeatable. It is thus very important to work efficiently, taking maximum advantage of the equipment at hand. We must not forget that these new abilities are but one means to reach our goal of gathering and promoting knowledge. Nevertheless, provided they are used properly, the potential these tools hold is too great for the archaeological community to ignore.

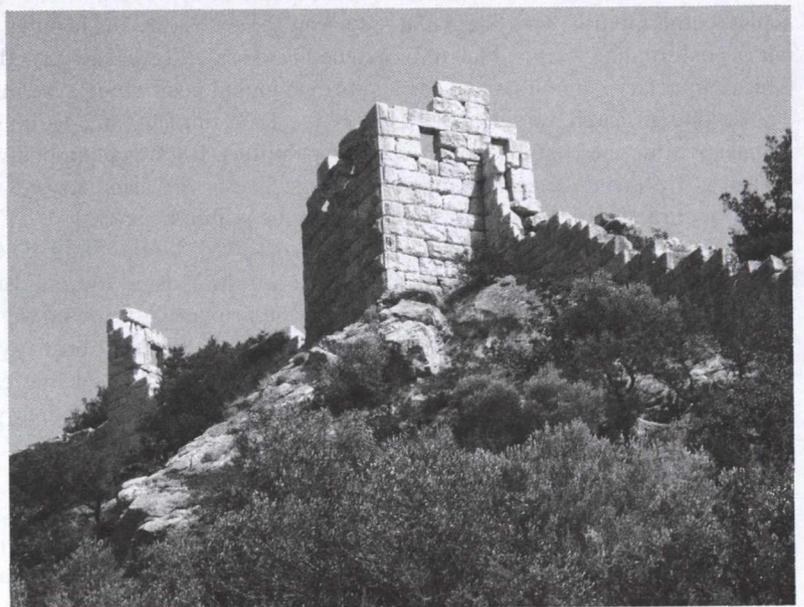
## FIGURES



Picture 1. Section of a wall found among other submerged structures in the Bay of Alyki.



Picture 2. Bronze Statue of Poseidon recovered from survey area in 1899.



Picture 3. Ancient fortification walls and tower protecting the harbour of Alyki.