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# DIVER



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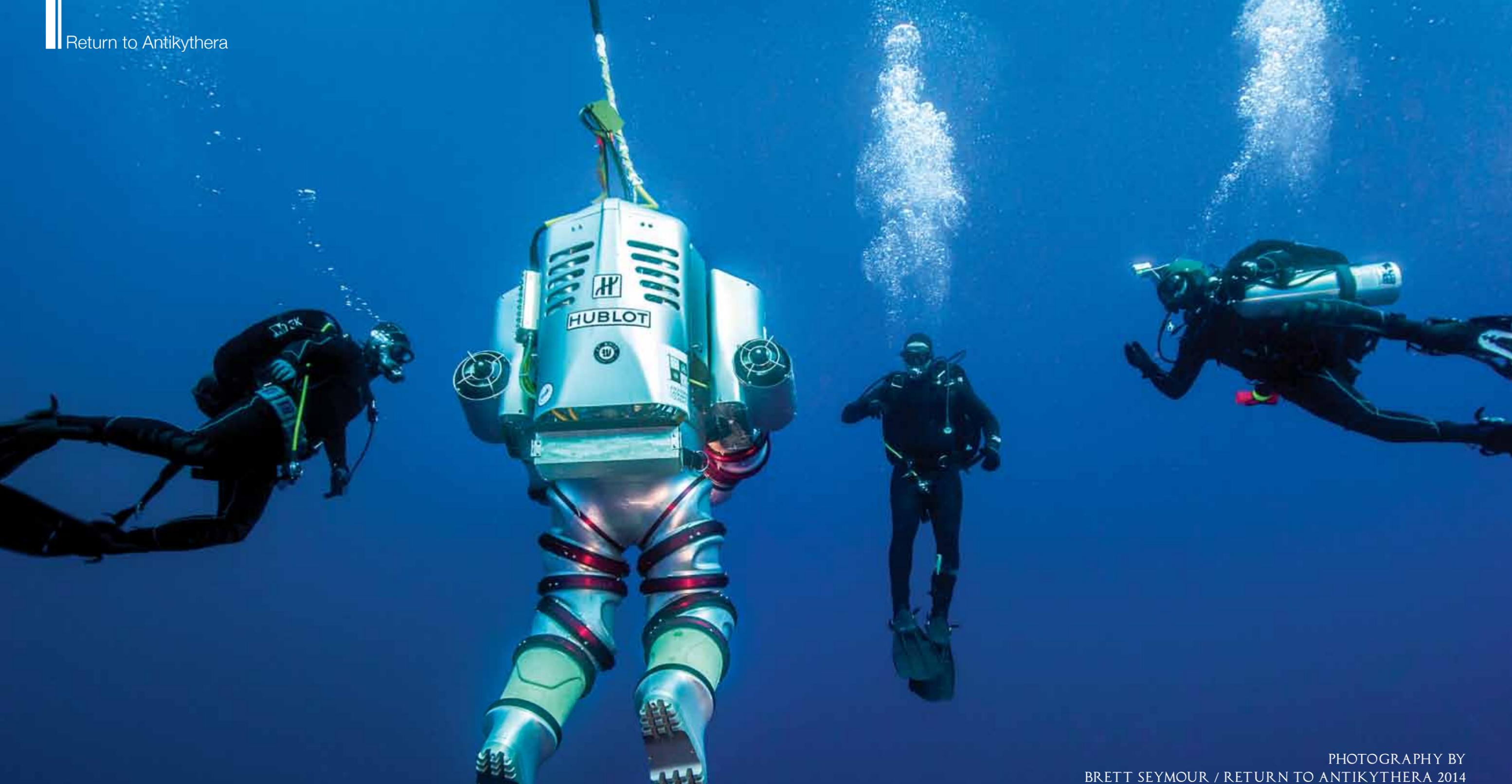
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# ANCIENT WRECK

Holds untold treasures

*Plus:*  
OCEAN ATLAS DEVIL'S GROTTA GATEFOLD TOBERMORY WRECK





PHOTOGRAPHY BY  
BRETT SEYMOUR / RETURN TO ANTIKYTHERA 2014

# ANCIENT WRECK REVISITED

HIGH TECH TEAM DIVES FOR ARCHAEOLOGICAL TREASURE



**P**iece by remarkable piece the ancient ship is revealing itself to scientists who say the long lost wreck and the archaeological treasures she is giving up are opening a window on the past unlike any previous discoveries.

Named for the Greek island that marks her grave, the Antikythera wreck is of unknown origin, resisting identity for more than a century, and previous scrutiny that includes a 1976 expedition led by diving pioneer Jacques Cousteau, whose television documentary, *Diving for Roman Plunder*, presents one colourful backstory for the vessel and its luxurious cargo.

The latest exploratory mission – September 15 to October 7 of this year – was the most ambitious to date, involving an international team of 35 archaeologists, divers and technicians

from Greece, the United States and Australia, using state-of-the-art technology to collect new data and artifacts that, increasingly, suggest investigators have only just scratched the surface of the unique site.

“We estimate 75 percent of all the artifacts remain in the sediments,” Antikythera research program co-director, Dr. Brendan Foley, told DIVER. Considering the trove of ancient treasures recovered since discovery by Greek sponge divers in 1900, Foley says the site is already unprecedented for the variety, quality, and sheer number of artifacts that it has relinquished. But ongoing fieldwork has made it clear, “We’ve only just begun to coax information from this wreck,” he said, adding that it just may be the most important, most famous shipwreck from antiquity.

“We’re hardcore scientists and archaeologists,” he said. “We hate

to speak of treasure but in this case, it’s actually a treasure ship and there are just no two ways about it.”

**Top left: One of the project dive platforms. Bottom left: Patmos Harbor, Antikythera, the project operations base. Top right: Project lead diver Alexandros Sotiriou. Bottom right and opposite page: a 2,200 year old bronze spear recovered this year and thought to be part of a large scale statue**

**Previous pages: Hellenic Navy safety divers with the Exosuit**

### Deep Challenge

Foley is a research specialist at the Woods Hole Oceanographic Institute in Massachusetts, and heads up the Antikythera research effort in tandem with co-director Dr. Theotokis Theodoulou, a maritime archaeologist in the Ephorate of Underwater Antiquities (EUA) of the Hellenic Ministry of Culture and Sports. Both men are experienced technical divers and the two project archaeologists who were trained to pilot the expedition’s advanced deep diving Exosuit, along with select dive team members who are Greek Navy SEALs, Navy Petty Officers and civilian technical divers.

At 200 plus feet (60-70m) the wreck site is not easily reached using conventional SCUBA equipment.

This year the Australian Centre for Marine Robotics deployed its autonomous underwater vehicle (AUV) Sirius, equipped with a full suite of oceanographic instruments, including a high-resolution stereo camera, strobes and multibeam sonar. The AUV completed a baseline survey of the site, the data from which produced a 3D map showing the work area in detail and revealing that it’s larger than first thought.

“Site mapping is the crucial first step in any archaeological project,” Foley said, explaining that it puts the artifacts into a context that shows their spatial relationship across the wreck and seabed area to be explored. To illustrate he said that in one area of the wreck site 230 by 130 feet (70x40m) they shot more than 30,000 overlapping digital images subsequently formed into a single photomosaic in which each pixel represents less than 0.15 inch (4mm).

*The mechanism is too complex to be a one-off prototype. It had to be one link in a chain of development*

“If we can come away from this important site with a very, very good map and a much better understanding of the layout of the wreck, from that data we can begin to pose new questions to drive the research forward,” he said.

The multibeam sonar identified archaeological targets at the site and in deeper water. The researchers knew that during the original salvage operations in 1900-01, large boulders had been dragged into deeper water to make the wreck site more accessible. One of them was raised, almost sinking the salvage ship in the process, but the effort proved worthwhile. Cleaned

up, the ‘boulder’ turned out to be a statue of Heracles, a.k.a. Hercules, now in the National Archaeological Museum in Athens. Further sonar work in 2012 confirmed the presumed locations of the relocated boulders, which for the time being remain on the ocean floor.

The Exosuit put humans with their critical faculties to work at the deep site, for the first time in a marine archaeology context. With articulating arms and legs, and thrusters, the aluminum alloy hard suit allows its occupant freedom of movement on dives to 1,000 feet (305m), extending dive time at the wreck site from minutes to hours. The one atmosphere Exosuit also rules out the decompression related injury and death suffered by some of the skilled hardhat divers who took turns sharing a single rubberized suit and brass helmet during that original recovery operation in



Lead diver Alexandros Sotiriou with 'lagynos' ceramic jug and bronze rigging ring

Artifact: © National Archaeological Museum, Athens / Courtesy: Archaeological Receipts Fund of the Hellenic Ministry of Culture and Sports

1900-01. Given the equipment and decompression practice of the day, their salvage work stands as a remarkable achievement.

All members of this year's dive exploration team were trained on closed circuit rebreathers, first used during the 2012 operation. Offering longer dive times and shorter decompression, rebreathers outperform open circuit SCUBA as used by Cousteau and his team decades before. Foley recalls: "Once we were trained on the rebreathers none of us wanted to go back to SCUBA." The rebreathers have proven to be a game changer working the deep wreck site.

**Titanic of Ancient World**

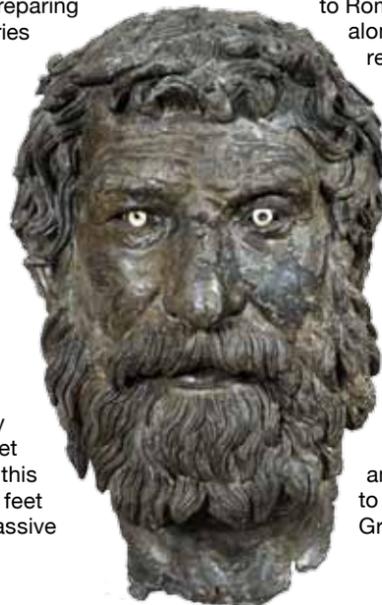
The Antikythera wreck is regarded as something of an archaeological Holy Grail. The site is at the crossroads of the Aegean and Mediterranean seas on a busy ancient world sea-lane. It's a challenging site to investigate for many reasons, not least because it's close by the island and exposed to all winds (except SW) that can make it difficult for a support ship to remain on station during diving operations. On site, vessels are just 260 feet (80m) from sheer cliffs

where the ancient ship likely met its end. Underwater, the cliffs are not conducive to laterally moving AUVs conducting sonar and photographic surveys. Of the site, Foley says, "It's inhospitable."

Though the 2014 expedition experienced bad weather with only five of 23 days suitable for diving operations, the team achieved every project goal ahead of schedule and with a more detailed understanding of what the site holds, scientists were able to allocate time preparing Ministry of Culture laboratories to handle all that's retrieved from the site.

Among items recovered this year were pieces of the shipwreck itself. The team raised several lead anchors, each more than three feet (1m) in length and a bronze rigging ring. Together with hull planks 4.3 inches (11cm) thick, raised by the Cousteau divers, evidence suggests the Antikythera ship is much larger than previously thought; as much as 165 feet (50m) in length. Ships from this period tend to be 65 to 100 feet (20-30m) in length. "The massive

Below: Sculpture from 1901 dives Opposite: WHOI Diving Safety Officer Ed O'Brian piloting the Exosuit



construction evident in the hull planks tell us this was a huge vessel, twice the size of any ancient wreck I've investigated," Foley said. "The evidence shows this is the largest ancient shipwreck ever discovered. It's the *Titanic* of the ancient world."

Dating from 70 to 60 BC, it's thought the ship carried its cargo of luxury goods, including bronze and marble statues, jewelry, coins, glassware, even furniture, on a journey from Asia Minor westwards to Rome. Antikythera is directly along this shipping route and, the reasoning goes, the vessel sank in a storm strong enough to smash it against the island's cliffs. Human remains recovered in the past include those of a woman and this has given rise to another theory for the richly-laden ship: that of a soon-to-be-married woman of means, en route to her betrothed and with dowry in hand, so to speak.

But origin of the wreck is not known. Foley said he and his colleagues hope to analyze the lead hull sheathing to determine its source. If it's Greek then the vessel could



THIS IS THE LARGEST ANCIENT SHIPWRECK EVER DISCOVERED. IT'S THE *TITANIC* OF THE ANCIENT WORLD.

## Return to Antikythera



The one atmosphere Exosuit allows hours of dive time with zero decompression time



have been constructed in the Aegean. Foley said some of the ceramic roof tiles recovered from the wreck bear Greek stamps. "We'll need to do a lot more research and excavation before we can draw any meaningful conclusions about the ship's home port," he said. Foley says that while the ship's route is also not known for sure, the cargo offers a few clues. He said the stone from which many of the marble statues were made came from the Greek island of Paros in the Aegean and that another island, Delos, may have been a stopping point along the ship's route, and a possible point of origin of the statues. "Various schools and even some individual sculptors have been suggested as the artists of these works," he said. Clay amphoras could have come from other Greek islands such as Kos and Rhodes. Many coins found at the wreck site come from Pergamon

in Asia Minor. Foley suggests that other cargo such as fine glass and ceramic tableware could have come from lands across a wide sweep of the eastern Mediterranean, today the countries of Syria, Lebanon and Israel. Artifacts recovered during this year's operation included the practical, such as a beautiful, and intact, table jug and an ornate bed leg. A 6.5-foot (2m) long spear was also found. Its size and weight suggest it was more likely for display than used as a weapon. Foley speculates it may be part of a large-scale statue, perhaps of a warrior or the goddess Athena. During the 1901 exploration divers identified four large marble horses that may have been part of a sculpture including chariot and warriors, complete with spear(s). The artifact for which

Top right: part of the celebrated 'Antikythera Mechanism'. Top left: Hellenic Navy and JF White project team recover Exosuit. Bottom: glassware recovered during an earlier expedition



the wreck site is best known is the Antikythera mechanism, as it's called, which dates from the 2nd century BC. This remarkably complex device is the most sophisticated mechanism that survives from antiquity and has astonished historians and archaeologists. Characterized as the world's oldest known mechanical computer, it tracked astronomical phenomena and the cycles of the Solar System, although this understanding came only after much research decades after its discovery. The mechanism is the embodiment of ancient knowledge, Foley says, because its manufacture exhibits the sophistication of ancient craftsmen, but it's also remarkable because it speaks to contact between people living far apart in time and distance. "The movements of the planets, eclipses, and orbital aberrations encoded in

the gear train were derived from centuries of celestial observations made by ancient astronomers, probably living in Mesopotamia and elsewhere around the eastern Mediterranean," he said. "They recorded those sightings on clay tablets, and eventually that information was embraced by the Greek masters who fashioned the mechanism." A fascinating aspect of the mechanism, Foley says, "Is that it's too complex to be a one-off prototype. It had to be one link in a chain of technical development. That means there must have been many more machines like it." Interestingly, he adds, "No workshop or lone genius produced anything as complex in the thousand years following the fall of the Roman Empire. Clearly, he is hopeful that archaeology will find more pieces to the puzzle that the Antikythera mechanism presents.

But this year researchers didn't find anything more related to the mechanism during their time in the field. "It was a real long shot to find more of this artifact because we don't know from what part of the wreck sponge divers retrieved it," Foley said. It's believed that more than half of the mechanism is still missing. The 2015 project will be planned in coming months. "We fully expect to work this site for at least five years," Foley says, noting that the Greek government is committed, though the country remains in the grip of an economic crisis. So far, most of the project funding, in excess of \$3 million, has come from private sources, the notable exception being support of the Hellenic Navy with ships and personnel. As if the Antikythera wreck isn't enough to keep everyone busy, team members are also interested

Below: a lifesize bronze statue, among many others, recovered on earlier expeditions.



in a second wreck about 800 feet (250m) to the south, where they've seen similar anchors and amphoras spread across the ocean floor. Carrying a high value cargo at a time when piracy was common, the Antikythera ship may well have been traveling with another vessel that met a similar end. The second wreck, "Looks like it's from the same time period," Foley said. Chemical analysis of the lead in their anchors will help the scientists determine whether or not the vessels are sister ships. Armed with modern technology and not a little tenacity, the researchers are diving into history on a ship many believe to be the richest ancient wreck ever found. What of the second ship? We learn more one artifact at a time. [ ]

For more go to: [www.antikythera.who.edu](http://www.antikythera.who.edu)