

Underwater Archaeology in DoD

Introduction and Background

The wrecks of warships, military aircraft, spacecraft and other government vessels are still U.S. owned. The principal government agency owners are the military services- U.S. Navy, U.S. Army and the U.S. Air Force. U.S. Coast Guard, General Services Administration (GSA) and the National Air and Space Administration (NASA) are also agencies with ship and aircraft wrecks. The Underwater Archaeology Branch (UA Branch) of the Naval Historical Center (NHC) manages the Navy's ship and aircraft wrecks. Authorization for this management comes to the NHC under the Secretary of the Navy (SECNAV) and the Office of the Chief of Naval Operations (OPNAV) Instructions and is conducted in accordance with the National Historic Preservation Act (NHPA). The basis for ownership is the Property Clause of the Constitution. A more recent legislative addition is the Sunken Military Craft Act (SMCa) of 2004. This Act codifies precedents in international and admiralty law and U.S. civil court cases. It establishes that U.S. Government-owned ships, aircraft, and spacecraft remain the property of the government even though lost at sea or on land. It also emphasizes that many of these are the burial sites of U.S. military personnel, thus also are war graves, treated according to the Geneva Convention, and are recognized as such in the Law of the Sea Convention. The Defense Prisoner of War (POW)/Missing Personnel (MP) Office (DPMO) and Joint POW/Missing in Action (MIA) Accounting Command (JPAC) are active in recovery of MIAs from the aircraft crash sites and the former is preparing inventories of MIAs from the WWII period as well as later periods of conflict. There are other concerns with the

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wrecks besides their cultural significance and war grave status. Environmental contaminants such as oil, ordnance, and weapon systems also are issues that come under consideration. U.S. ownership is not impacted by the passage of time or disuse of the property. There is no time line in the SMCa, for it applies equally to ships lost today as it does those lost by the Continental Army and Navy during the American Revolution.

The UA Branch beginnings go back to 1993 and the receipt of Department of Defense (DoD) Legacy Resource Management Program (Legacy) funds to develop a management plan for the Navy's shipwrecks. A major focus at the inception of the underwater archaeology program was to create a wreck database from the archival sources. This inventory now contains some 3,000 ship and 12,000 aircraft wrecks. Besides Navy wrecks, the numbers include U.S. Army shipwrecks such as troop transports and Confederate wrecks, which come under GSA, as generic U.S. Government property. The 12,000 aircraft wrecks in the database are only US Navy planes. We have no tally of Army Air Corps or U.S. Air Force.

Over the last 10 years, Legacy support has helped the underwater archaeology community to document and preserve some of the United States' most significant sunken archaeological treasures: *H.L. Hunley*, *USS Monitor*, *CSS Alabama*, and *USS Arizona* are familiar names that reached national awareness. Perhaps less known, although equally significant, are the Revolutionary War fleet scuttled by Continental Army and Navy forces in the Penobscot River, Maine, and Benedict Arnold's Revolutionary War gunboat sunk in Lake Champlain, VT. The Civil War shipwreck *USS Tulip*, the artifacts of which

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were recovered from looters and conserved, is the Navy's largest single collection of Civil War artifacts. There are also well over a dozen state-specific management plans and Memorandum of Agreements (MOA) for the cooperative federal/state management of DoD ship and aircraft wrecks. The three most recent inventory projects -- Virginia, South Carolina, and Georgia -- are primarily Geographic Information System (GIS) projects. There are also GIS projects for specific shipwreck survey projects such as D-Day, USS *Alligator*, and John Paul Jones' *Bonhomme Richard*. We have also addressed the question of aircraft as archaeological sites and historic properties under NHPA. The National Register's Aviation Bulletin was funded through Legacy.

Summary of Findings and Issues

Archival research alone is an inadequate tool to inventory and manage wrecks. Written records never show what still exists. They are at best sketchy, containing inaccuracies, and failing to answer questions of the state of preservation, rate of deterioration, and environmental hazards of wrecks. The Navy's UA Branch locates and assesses shipwrecks through real world survey. An example is the survey of the wrecks lost during WWII D-Day operations during the invasion of Normandy—Omaha and Utah Beaches and Point du Hoc. The UA Branch has an in-house archaeological team and also works with Navy dive teams, as well as National Oceanic and Atmospheric Administration (NOAA) and the National Park Service (NPS) divers. Collaboration with states, universities and not-for-profits are frequent mechanisms to accomplish goals through partnership. Outside groups are interested for manifold reasons, including pure archaeological research, thrill of discovery, locating remains of lost servicemen/women,

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and other areas of complementary scientific research. Advances in the technologies of remote sensing, global positioning, robotic vehicles, and technical diving make it possible to locate any ship or aircraft that was ever lost. Awareness and discovery coupled with affordable technologies is forcing us within DoD to address the management issues of these wrecks. Laws and ethics do not keep up with advances in technology and their environment alone no longer protects sunken wrecks. There is increased expectation by members of Congress and the public that the government will look after these wrecks, as archaeological sites and as war graves. In many ways these are like undiscovered islands, but which are already titled as U.S. property and are distributed worldwide.

Typical survey work includes remote sensing with side scan sonar, magnetometer, and multi-beam sonar. The raw data is processed with specialized software systems and can be managed in GIS systems. Imagery can mosaic into site maps of the wrecks and with multi-beam sonar can be placed in a 3-dimensional format. Remotely Operated Vehicles (ROV) and Autonomous Underwater Vehicles (AUV) are increasingly used replacing divers for many activities. Diving technology has advanced, however, with technical divers using mixed gas and rebreathers to dive to unheard of depths. New technologies and processes enable us to do increasingly more to interpret shipwrecks. These technologies have their parallel uses in the military, salvage, and engineering disciplines.

Archaeology can use cutting edge technologies and help move the innovation process forward. A recent example is the survey work of the remains of USS

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Cumberland, the wooden-hulled sailing vessel destroyed by CSS *Virginia*. A new sonar camera mounted on an ROV revealed stunningly clear images in zero visibility water. The wreck site was reinterpreted and found to have more archaeological integrity than previously thought. Development of such technology can directly benefit Navy divers allowing them to work in zero visibility.

Future Research Issues

It is possible to combine cultural resources management of shipwrecks with military R&D that will benefit both communities, such as DoD labs, and the federal cultural resource teams. Underwater archaeology is dependent on advances in technology but it also pushes the science and technology forward with the research questions it asks, and the multi-disciplinary solutions can have benefits to the military and private sectors. Underwater archaeology is heavily dependent upon other scientists and engineers with diverse backgrounds. The *Hunley* project is a good example of this for it brought in engineers, material scientists, physical scientists, forensic anthropologists, genetic researchers, geologists and others to work alongside the archaeologists and conservators. The multi-disciplinary nature of the work brings scientists together that might not otherwise meet.

For this workshop I have identified five key research areas for the future that meet the criteria of advancing the management of DoD ship and aircraft wrecks and at the same

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time accomplishing new cutting edge research and development (R&D) benefiting the DoD mission.

Identification and assessment of US Government-owned wrecks are essential to the management of these resources. You cannot respond to issues or questions concerning the cultural resources aspect, human remains/MIAs, ordnance, and environmental concerns without intelligence locating the wrecks.

- 1) Technologies that enable remotely searching for and identification of wrecks at economical costs such as with AUVs can be one way of accomplishing the mapping process. The Navy and private sector are already involved in AUV research and use.
- 2) Predictive Modeling of where significant wrecks are located in order to be aware of the impact of marine activities such as dredging and pipeline and cable laying, or to define where to search. Examples of such modeling could be creating drift or re-navigation models based on last historic sightings of wrecks and projecting the sinking locations forward using wind, current and tide information. Marrying this information into a GIS system provides a new product that designates areas of interest. It also has benefits to other sciences such as oceanography and furthers the military's identification of non-submarine contacts.
- 3) In order to manage this inventory of wrecks and be able to store and manipulate large electronic files derived from remote sensing data a GIS system is needed. It

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must allow a world-wide resource management by manipulating large data files easily.

As mentioned above, we manage and preserve wrecks for not only cultural reasons but also because of potential environmental hazards from oil spills, explosive ordnance, weapon systems, and war grave issues. We might look at ways of not removing ordnance or bunkers of oils from wrecks, as the cost of such salvage operations would be very high and the risk of a spill great. Instead we might research technology or identify the processes whereby wrecks survive longer in situ on the sea bottom or even be encapsulated.

- 1) R& D for in situ preservation might take the form of studying the corrosion and deterioration of steel and aluminum hulls of ships and aircraft. The study of iron corrosion is currently being pushed forward by the conservation research of the *USS Monitor* and *H.L. Hunley* projects. In the latter case a new method of removing salts from iron is being investigated. If successful, it could result in not only better preservation of artifacts such as *Hunley* and *Monitor* but have applications for modern materials including those owned by DoD. Aluminum corrosion is one area where even less is understood than with iron. The wrecks of WWII aircraft “warbirds” are under intense pressure by private collectors and museums, as well as the environment. However, when these are recovered from salt water they deteriorate more rapidly on land than in the water. Obviously

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advances in aluminum conservation and limiting corrosion have other benefits to the built environment including the military.

- 2) Developing ROV and AUV technology, sensor packages, and processes can enable monitoring of wrecks, their rates of deterioration, and the quality of water around them. Likewise, continuing innovations in affordable ROV technology will allow archaeologists to do more remote monitoring of wreck sites particularly those that are deep, have limited visibility, high currents, and other environmental difficulties.

Conclusions

Underwater archaeology can accomplish mutual goals of R&D and cultural resource management (CRM) thus benefiting the Navy and DoD. This partnership between R&D and CRM can be a joint service approach not only benefiting the Navy but also U.S. Army, U.S. Air Force, and U.S. Marine Corps. As mentioned above, all are stakeholders having lost ships and aircraft, and are still U.S. government managers of these wrecks.

The military wrecks are also a means of interpreting the history of the services. Other benefits to DoD also include public education particularly as awareness pertains to the history and mission of the services and role the military plays in the past, present, and future in protecting the country. Discovery of a military wreck and in the case of the MIAs the resolution for family members captures the public's imagination and raises that

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awareness. This occurs in the normal process of complying with our management mandate.

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