Technical Proposal for:

A Remote-Sensing Survey of the *Maple Leaf* Site
Located in the St. Johns River
Jacksonville, Florida

Submitted to:

St. Johns Archaeological Expeditions, LLC
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Submitted by:

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Introduction

The firm of Tower Cloud Communications is in the process of formulating permits for the placement of a fiber optic cable under the St. Johns River proximate to and south of a designated cable area extending from Mandarin Point to Orange Park. Olsen Associates Inc. (OA) is working with the St. Johns Archaeological Expeditions, LLC. (SJAE) to identify the precise location of the steamer Maple Leaf. The Maple Leaf site is a National Historic Landmark (NHL) that lies unmarked in the immediate vicinity of the designated "Cable Area" identified on NOAA Chart 11492 (Figure 1).

Figure 1. Mandarin Point to Orange Park designated cable crossing (NOAA Chart 11492).

To determine precise location of that historic vessel Tidewater Atlantic Research, Inc. (TAR) proposes to employ magnetic and acoustic remote sensing in a Phase I survey to relocate Maple Leaf and determine the precise geographical coordinates for the vessel and the NHL site. Historical information provided by OA and SJAE place Maple Leaf and the NHL site within the designated "Cable Crossing" (Figure 2). The intent of the proposed work is to ensure that the cable installation by Tower Cloud will not disturb or impact the NHL Maple Leaf Site.
In order to relocate Maple Leaf and generate precise geographical coordinates for the vessel, TAR proposes to survey an area based on the best known position of the wreck provided by SJAE and the designated "Cable Area" identified on NOAA Chart 11492.

Proposed Research Methodology

The methodology proposed by TAR will combine state-of-the-art technology, experienced personnel, and an investigative methodology designed to generate geographically accurate remote sensing data. Equipment for the project has been selected to provide maximum reliability in wreck identification and location. Personnel responsible for the remote-sensing investigation have been selected to combine a variety of individual talents and extensive submerged cultural resource research and survey experience. That experience provides assurance of maximum operational efficiency, accuracy and professional assessment of the data.

The investigation proposed by TAR is designed to conform to survey standards that will provide accurate and reliable identification, assessment, and remote-sensing documentation of submerged cultural resources in the prospective project area in terms of the criteria established in compliance with the National Historic Preservation Act of 1966, as amended,
and the Archaeological and Historic Preservation Act of 1979, as amended. The results of the proposed investigation will provide OA and SAJE with the archaeological data essential to evaluating compliance with both state and Federal submerged cultural resource legislation and regulations.

**Remote-Sensing Survey**

To identify the location of *Maple Leaf*, TAR proposes to conduct a systematic remote-sensing survey of the proposed project area (Figure 3) utilizing a 25-foot vessel. TAR proposes to employ both magnetic and acoustic remote sensing. A combination of magnetic and acoustic remote-sensing equipment represents the state of the art in submerged cultural resource location technology and offers the most consistent and cost-effective method to locate and identify potentially significant targets. Data collection will be controlled using a differential global positioning system (DGPS). The DGPS produces the highly accurate coordinates necessary to support a sophisticated navigation program and assure reliable target location.

![Figure 3. Proposed Maple Leaf survey location.](image-url)
Magnetic Remote Sensing

Magnetometer

An EG&G Geometrics 881 dual channel cesium vapor magnetometer capable of plus or minus 0.1 gamma resolution will be employed to collect magnetic data in the survey area. To produce the most comprehensive magnetic record, data will be collected on a one-second interval, and the sensor will be deployed and maintained in the water column at a depth of 10 to 12 feet above the bottom surface. A computer will provide a continuous permanent record of the magnetic background and target signatures. Initial magnetic remote sensing will be carried out at a 100-foot line spacing.

Once *Maple Leaf* has been identified, additional lines will be set up at a 50-foot line spacing to generate data for contouring. Magnetic data will be recorded as a data file associated with the computer navigation system. Data from the survey area will be contour plotted using QuickSurf software to facilitate anomaly location and definition of target signature characteristics. All magnetic data will be correlated with the acoustic remote-sensing records.

Acoustic Remote Sensing

Sub-bottom Profiler

An EDGETECH 4100 high-resolution digital sub-bottom profiler (SBP) with a 216 transducer will be employed to collect seismic acoustic data in the survey area. During the survey, the transducer will be deployed and maintained at a 5 to 10-foot elevation above the bottom surface unless shallow water dictates otherwise. SBP data will also be collected along transects spaced on 50-foot intervals based on the magnetic signature of the wreck. SBP acoustic data will be recorded as a data file and tied to the magnetic data by regular DGPS annotations. Additional lanes may be run in the vicinity of anomalies potentially associated with *Maple Leaf* to enhance target signature definition.

Positioning System

The remote-sensing survey will run on a digitized navigation chart of the project area. A DGPS will be used to control navigation and data collection in the survey area. The DGPS system has sub-meter accuracy and can be used to generate precise coordinates for the computer navigation system. A TRIMBLE dedicated DGPS will be used. The DGPS will be operated in conjunction with an on-board PC laptop loaded with HYPACK navigation and data collection software. All magnetic and acoustic records will be tied to positioning events generated by HYPACK and magnetic data will be stored in the computer in conjunction with DGPS generated positioning coordinates.
Data Analysis

All data will be assessed by TAR principal investigator. All target signatures suggestive of significant submerged cultural material will be isolated and analyzed in accordance with anomaly intensity, duration, areal extent, and signature characteristics suggestive of the material generating the anomaly. Analysis of each target signature will include consideration of magnetic and acoustic signature characteristics previously demonstrated to be reliable indicators of historically significant submerged cultural resources. Assessment of each target will include recommendations for additional investigation to determine the exact nature of cultural material generating the signature and potential National Register of Historic Places significance. Data collected from any previously conducted survey of the bridge site will be examined.

Available historical evidence will provide a background context that identifies correlations with Maple Leaf and other magnetic anomalies. A magnetic contour map of the survey area will be produced to aid in the analysis of all anomalies. The magnetic contour map will include target location, Florida state plane coordinates; bar scale and north arrow; the locations of channel beacons and buoys, channel alignments, and the charted cable crossing within the project area.

Acoustic data generated by the subbottom profiler will be assessed for correlations with the magnetic data. Any stratigraphic evidence of Maple Leaf will be plotted to facilitate identifying the precise location of hull and machinery remains within the NHL site.

To accompany the contour map and plot of subbottom features, TAR will prepare a table listing all magnetic anomalies, and potentially significant sub-bottom features located during the survey. This table will include project name, survey area, target number, coordinates, and signature characteristics.

Report Deliverables

Within five business days after the completion of the field investigations, TAR will report to OA and SAJE with the preliminary results of the survey. TAR will follow up after the initial email notifications with a Management Summary within 15 business days following completion of the fieldwork. The Management Summary will briefly describe the field methods used. The results will be described in sufficient detail to provide a basis for specific recommendations of significance for identified magnetic anomalies. The summary will also include a magnetic anomaly map showing the Florida state plane coordinates for Maple Leaf and all anomalies identified as potentially significant and recommendations for additional evaluation of targets determined to represent potentially significant historic resources.
Report documentation of the submerged cultural resource survey will include a description of the methodology employed, identification of the equipment and personnel, and a target specific assessment of the data. Perhaps most importantly, that document will confirm the precise location of Maple Leaf and any potentially associated anomalies. Florida state plane, NAD 83, US Survey Foot coordinates for Maple Leaf and any associated anomalies will provide an accurate location for the wreck site and the NHL buffer zone.

Experience Qualifications

Gordon P. Watts, Jr., Principal Investigator

Gordon Watts’ experience in maritime history and underwater archaeology spans more than 45 years. That experience has been accumulated in a variety of positions that included responsibility for program administration, cultural resource management, academic and public education and historical and underwater archaeological research and writing. Dr. Watts holds a M.A. degree in History from East Carolina University in Greenville, North Carolina and a Ph.D. in Maritime History from the University of St. Andrews in Fife, Scotland. He currently serves as the director of TAR and the director of the Institute for International Maritime Research, a non-profit research institute. Dr. Watts retired in January 2001 from East Carolina University (ECU) serving the university's Program in Maritime History and Nautical Archaeology as a professor of Nautical Archaeology for 20 years.

From 1972 until 1981, Dr. Watts was employed by the North Carolina Department of Cultural Resources. After serving for several years as an underwater archaeologist, Dr. Watts was placed in charge of the Underwater Archaeology Branch in 1978. That unit was created to make management of North Carolina’s submerged cultural resources more effective. Activities of the branch included development of a submerged cultural resource management plan, survey and planning, grant development, environmental review, education (public and academic), contract administration, public information, preservation and historic and archaeological research. In addition to activities related to resource management, the Branch cooperated with the National Oceanic and Atmospheric Administration in developing research and management programs for the USS Monitor National Marine Sanctuary.

In 1981, Dr. Watts accepted a teaching and administrative position with ECU to assist in establishing the Program in Maritime History and Nautical Archaeology. That program was designed and organized to provide graduate educational opportunities in maritime history and underwater archaeology. Today that program includes both traditional courses in history and field research experience involving site location, identification, testing and
excavation projects. Since 1981, Dr. Watts’ grant and university-supported field research projects have included remote sensing and/or site specific investigations along the Atlantic Seaboard, in the Great Lakes and Gulf of Mexico, Europe, Bermuda and in a number of islands in the Caribbean and West Indies.

Shipwreck experience related to those areas includes sites that date from the period of exploration in the early sixteenth century to the American Civil War. Much of that work has involved the excavation, recovery, and documentation of the sixteenth century Western Ledge Reef Wreck and the excavation and documentation of vessels such as the seventeenth century Stonewall and New Old Spaniard wrecks and the nineteenth century French frigate L’Herminie in Bermuda.

In the United States, Dr. Watts’ experience in excavation and documentation includes the eighteenth century British transport Betsy and Cornwallis Cave Wrecks at Yorktown, Virginia; the El Nuevo Constante off the Louisiana coast; a variety of late eighteenth and early nineteenth century sail and steam wrecks at Savannah, Georgia; a nineteenth century schooner in the Cape Fear River at Wilmington, North Carolina; and a variety of Great Lakes vessels that include a steam powered lightship, several grain and ore carriers, and fishing and lumber schooners. Dr. Watts has also directed research on a variety of Civil War vessels that include blockade runners, blockade vessels, and gunboats such as the C.S.S. Chattahoochee and U.S.S. Southfield and the ironclads U.S.S. Monitor, U.S.S. Tecumseh, C.S.S. North Carolina, C.S.S. Richmond, and C.S.S. Jackson.

Dr. Watts also serves in a variety of capacities to assist the National Oceanic and Atmospheric Administration in developing a program for protecting, investigating, and developing the remains of the U.S.S. Monitor, the Canadian Government with research and management of the War of 1812 schooners Hamilton and Scourge, and the French Association C.S.S. Alabama with research and management of the Confederate commerce raider C.S.S. Alabama.

Robin Arnold, Senior Historian

Ms. Arnold received a B.A. in History and Political Science from ECU and completed the course requirements for an M.A. in History at that institution. She has assisted with archival research and writing, editing, report preparation and GIS development at Tidewater Atlantic Research since 1988. Since 1993, Ms. Arnold has been the office manager for TAR. In that capacity, she has also been responsible for general business matters, proposal development and contract administration. In 2005, Ms. Arnold received certification by NOAA for a Coastal Application, ArcGIS training module and similar instruction.
In regard to Historic Preservation & Cultural Resource Management, Ms. Arnold serves as the Section 106 Compliance Specialist for TAR. In 2010, Ms. Arnold received certifications by the Advisory Council on Historic Preservation for *Section 106 Essentials* and *Advanced Section 106* training. In 2012, Ms. Arnold received certification from the National Preservation Institute for *Identification and management of Traditional Cultural Places* training.