



# **JPAC's Underwater Search and Recovery Process**

*Richard K. Wills*

*Andrew T. Pietruszka*

*Central Identification Laboratory*



# ***Underwater Operations at JPAC***

- JPAC takes ***overwater loss cases*** and ***underwater sites and leads*** into consideration as part of the larger search and recovery planning process.
- At present, JPAC typically plans and executes at least two underwater investigation activities and two underwater recovery activities each year. Additional activities occur as situation and funding permit.
- CIL Forensic Anthropologists with training in Underwater Archaeology support the planning process and oversee the scientific aspects of much of the field work.

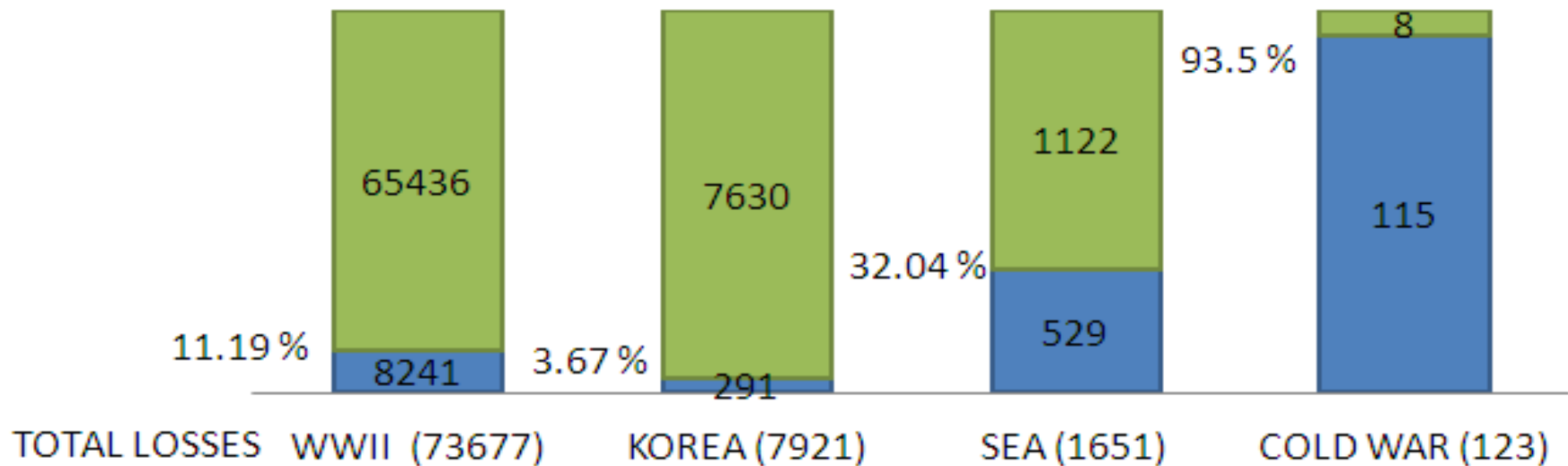




# Unaccounted-For Individuals by Conflict: Land vs Water Losses\*

Individuals By Conflict

Underwater Losses Land Losses





# ***Setting Up an Underwater Program***

- Staff (Anthropologists, Dive Planner, Core Dive Team)
- SOPs
- Phased approach (search, survey, and recovery)
- Planning on a mission-specific basis (research design, equipment, team, platform, timeframe)
- Basic in-house capabilities (remote sensing, diving)
- Relationships with other organizations (Navy and Army expeditionary salvage/engineering diving units, EODMUs, NCBs, Navy Underwater Combat Camera, NAVO, MSC, etc.)

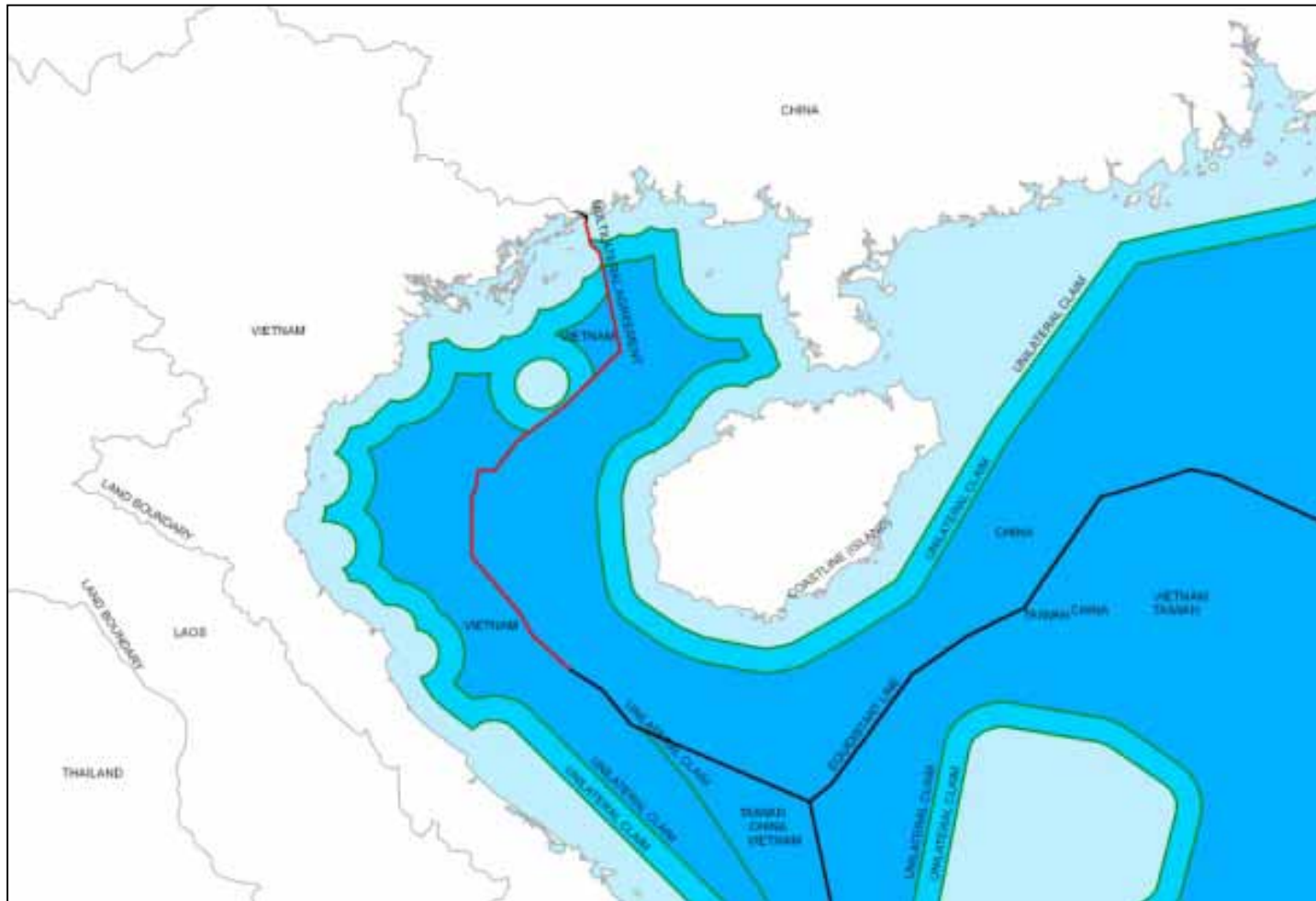


# ***Setting Up an Underwater Program***

- Coordination with property custodians, land-owners, and/or host-nation governments
- Basic evidence stabilization procedures (desalination)
- Systematic historical research effort (*proactive* versus *reactive*)
- Data management scheme
- Underwater Geographic Information System (UGIS) to manage geospatial data and assist in planning
- Research and development of specific tools more suited to our unique needs



# Underwater GIS



## Maritime Boundary / Political Jurisdiction Data



# *Ways of Sorting Information*

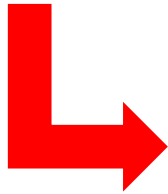
- Types of Loss Incidents (Nature of Incident, Level of Information available, Level of interest to JPAC)
- Types of Leads (Source of information)
- Types of Sites (Level of Intactness, Nature of the Environment, Complexity of Site)
- Types of Site Formation Processes (Processes at work in how site was formed, processes at work on site following its formation)





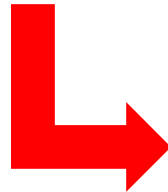
# *Underwater Site Development Process*

Historical Loss Incident



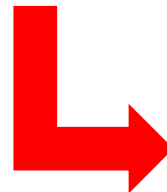
Lead on a Site Generated

- Historical research
- Informant-provided



Search Process (Investigation)

- Search Areas are proposed
- Areas are searched
- Targets of Interest are investigated



Site is Encountered

- Survey (Investigation)
- Recovery



# *Diagnostic Evidence*

- Human remains
- Identification media
- Personally worn or carried items
- Aircrew apparel
- Aircraft egress systems
- Escape, evasion, and survival-related items
- In certain cases, selected items that otherwise serve to correlate a site to a specific case (aircraft wreckage with identifying data, etc)





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## *Underwater Investigation: Site Leads*



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## *Underwater Investigation: Platforms*

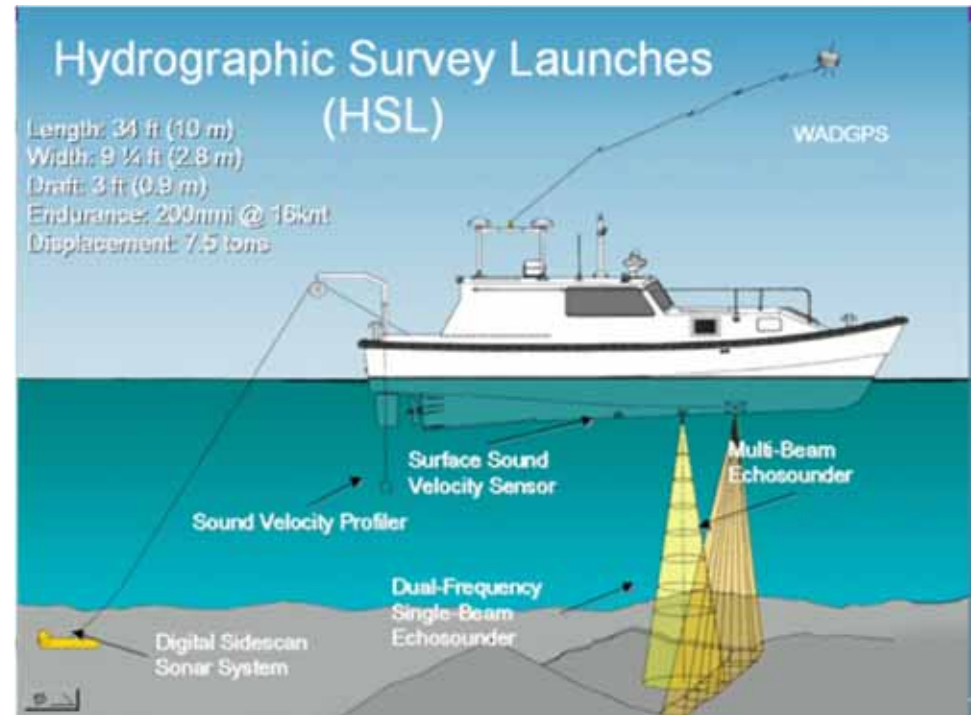


Shore-based or Ship-based Small Boat Team: Lightweight, Short-Distance Range, Portable, Maneuverable, Working Depths 5-100 ft

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## Underwater Investigation: Platforms



Hydrographic Survey Launches (HSLs) or local watercraft of opportunity: Heavy, Medium-distance, Maneuverable, Depths 20-130 ft

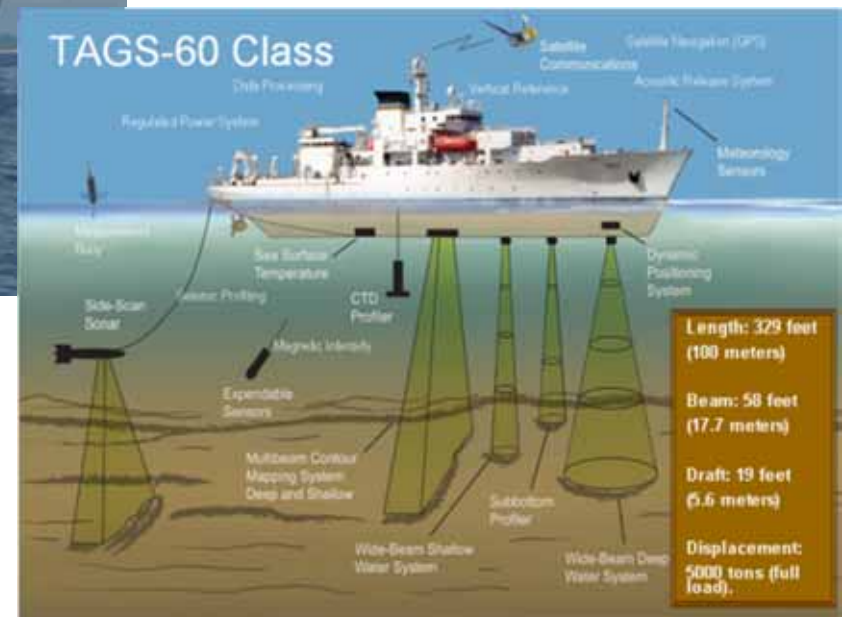


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## *Underwater Investigation: Platforms*



T-AGS-60 Class Hydrographic Survey Vessel: Heavy, Long-distance, Low Maneuverability, 130 ft+ depths



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## *Underwater Investigation: Methods and Tools*



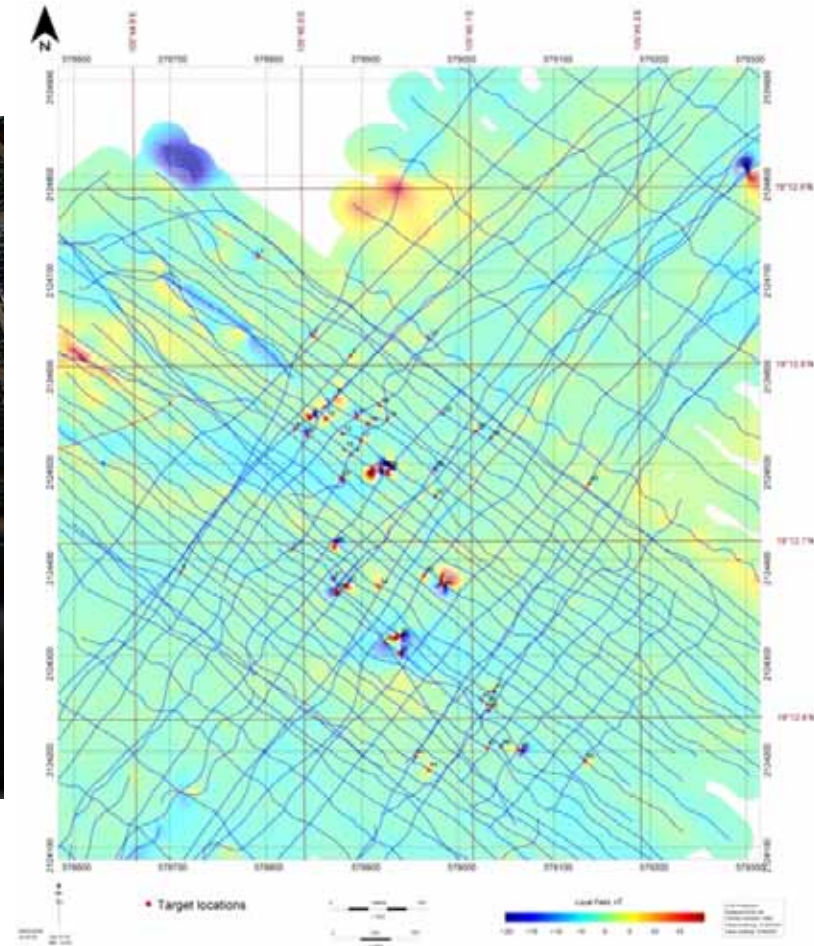
**Side-Scan Sonar: Searching for Acoustic Anomalies**

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# *Underwater Investigation: Methods and Tools*



**Marine Magnetometer: Searching for ferro-magnetic anomalies**

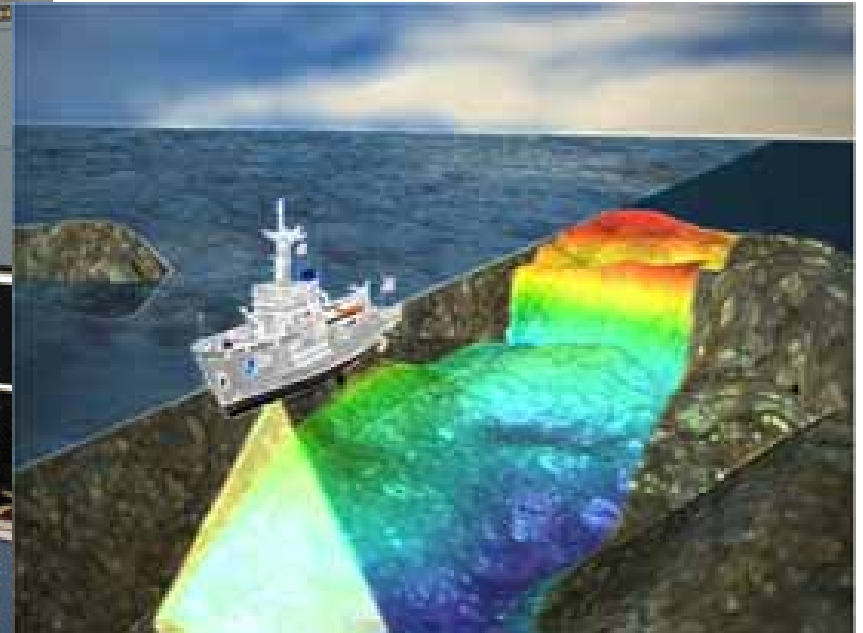
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## *Underwater Investigation: Methods and Tools*



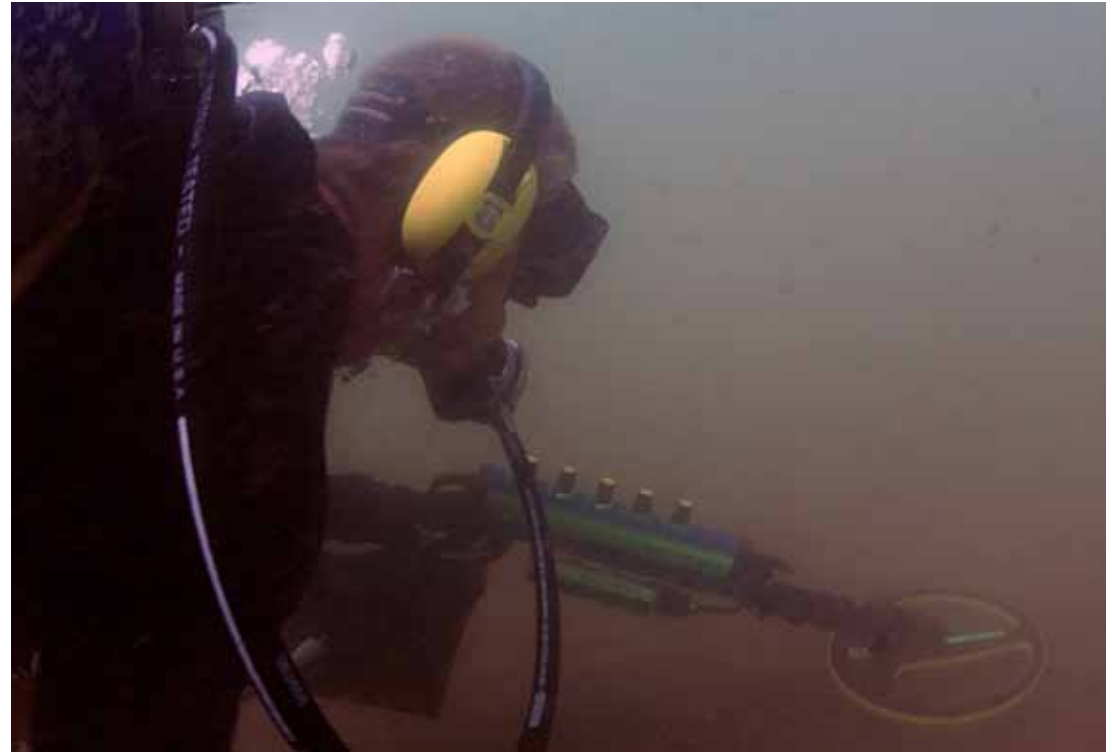
**Multi-beam Echo-sounder: Determining broader area bathymetry and detecting targets of interest**

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## *Underwater Investigation: Methods and Tools*



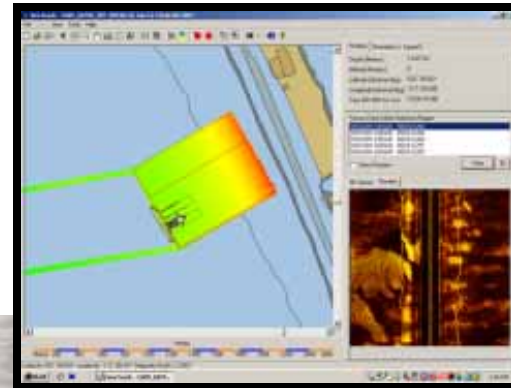
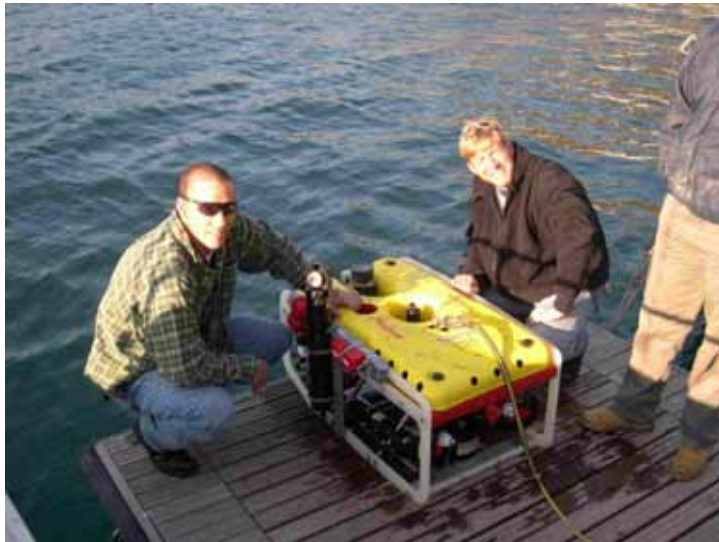
In-water Survey and Target Verification: divers, search patterns, metal detectors, photo/video

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## *Underwater Investigation: Methods and Tools*



In-water Survey and Target Verification: AUVs (UUVs), ROVs

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## *Underwater Investigation: Methods and Tools*



**Probing & Sampling: Characterizing and correlating anomalies and deposits**

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## *Underwater Investigation: Methods and Tools*



**Test Excavations: Target characterization, assessing approximate site size and depth**

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## *Underwater Recovery: Platforms*



**Staging Operations from  
Shore  
(Very Shallow Water <30 ft;  
>50m)**



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## *Underwater Recovery: Platforms*



**Light Surface Supply Air System  
from Small Craft or Shore  
(Small Riverine >30 ft; >50m)**

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## *Underwater Recovery: Platforms*



**Flat-Bottom Barge w/ Surface Supply Dive System and Crane  
(Shallow Water <100 ft; <10km)**

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## *Underwater Recovery: Platforms*



**T-ARS-50 Class Navy Salvage Vessel  
(Deeper Water >100 ft; >10km)**

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# *Underwater Recovery: Methods and Tools*



**Underwater Mapping  
Methods  
(Angle / Distance  
Measurement, Triangulation,  
Installed Grid Systems)**





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## *Underwater Recovery: Methods and Tools*



### **Underwater Suction Dredge System**

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## *Underwater Recovery: Methods and Tools*



**Wet-screening  
configurations**

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## *Underwater Recovery: Methods and Tools*



**Lifting Baskets for bringing excavated sediment to screens**

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**THANK YOU**