APPENDIX D

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How to Use Site Recorder

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How to Use Site Recorder

Core Knowledge of the Appendix

This appendix introduces students to using Site Recorder in preparation for the practical dive session in Unit 12.

Upon completion of the How to Use Site Recorder appendix student will:

- *Be able to understand the scope of Site Recorder*
- *Be able to use Site Recorder to complete a site survey project*

Introduction to the Appendix

Although Site Recorder is a multi-featured and versatile Geographic Information System (GIS) specifically designed for use in underwater and coastal archaeology, it was chosen for the Foundation Course to primarily fulfil its function as a tool for processing, storing and displaying survey data.

During Unit 2: *Back to Basics*, students have the opportunity to practice 2-dimensional survey techniques and are shown how to transfer the results to paper by using scale rules, drawing compasses and pencils. Following this, students are instructed in the use of the Site Recorder and shown how the same tasks (and much more) can be achieved using an alternative 'computer' method.

Students can practice using the software by downloading the demo version from 3H's website, which enables most of the tools to be used or by utilizing the licensed copy held by the training centre.

During the practical diving session students have the option to use the application for storing site information, dive logs and survey results that contribute to the development of the management plan and site plan.

The following appendix, which should be read in conjunction with Unit 7: *Data Management in Maritime and Underwater Archaeology*, has been included as a teaching resource so that trainers can familiarize themselves with the software. However, trainers should note that there are other options and the ultimate choice of which to use is their own decision.

1 Site Recorder

Site Recorder can store and manipulate different categories of data collected on site and is an ideal practical tool for supporting the dive teams working on the Mannok wreck site. All of the captured data can be processed, stored and used to support the development of the management plan and the site plan during the practical dive session.

The typical applications for Site Recorder include:

- *Resource evaluation and management*
- *Site survey planning and recording*
- *Geophysical survey post-processing*
- *Search planning and post-processing*
- *Excavation planning and recording*
- *Archiving site data*
- *Site publication and reporting*

Once all of the information about a site is captured in a 'site file' it can be used as a basis for creating reports or exported for further processing in other programs. Complete sites and associated image and source files can be published on CD or DVD, along with a free reader program called Site Reader. As the entire site information can be held in one place and linked together, this also forms an ideal method for archiving site data.
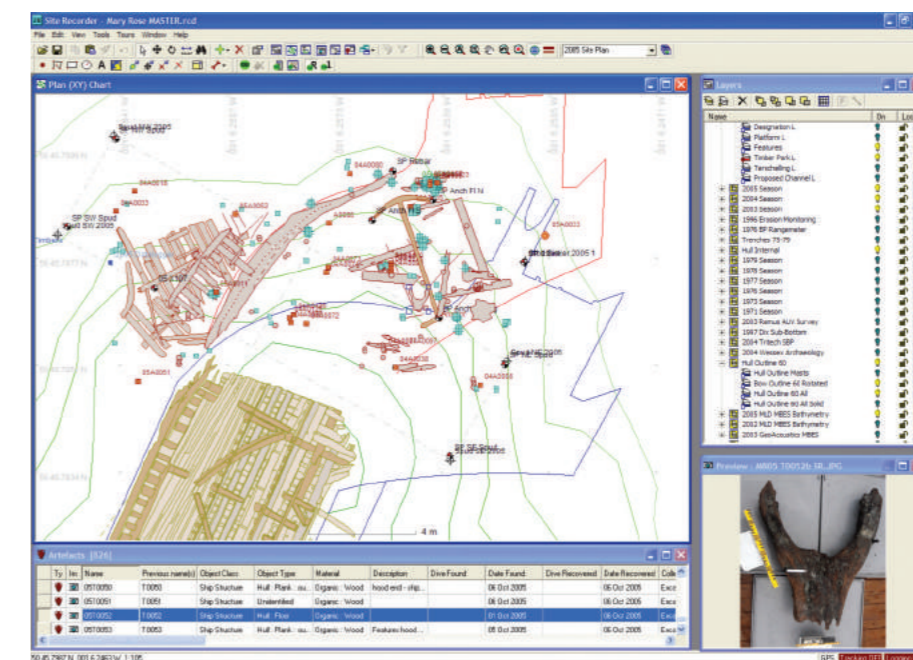
A typical screenshot from Site Recorder shows the site of the Mary Rose, with the main section of the hull shown in the lower part of the image.

The more recent discoveries associated with the bow sections are shown in the upper part of the image.
© Peter R. Holt

📖 ***Suggested Reading***

Bowens, A. (ed.). 2009. *Underwater Archaeology - The NAS Guide to Principles and Practice*. Second Edition. Blackwell Publishing.

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2 Object Types

Artefact: the Artefact object is used to record information about a single artefact or find. All of the information about that one find is recorded within one single object.

Feature: Feature objects are used to record features and contexts found on the site. Features are commonly used to record information about concretions that contain other Artefact objects.

Sector: Sector objects are used for defining an area of the site, such as a trench.

Sample: Sample objects are used to record information about samples taken for environmental evidence or type identification. Environmental samples can give clues about the potential survival of artefacts and the detail of an object's burial environment can give clues to the conservation required.

Survey Point: Survey Point objects are used to represent the control survey points and detail survey points used for positioning on site.

Measurement: individual measurements made between survey points are recorded in separate Measurement objects. Supported measurement types include distance, depth, offset, ties, radial and position.

Image: Image objects are used to record information about any object including photographs, drawings and video clips.

Image Basemap: Image Basemap objects are used to record information about base map pictures such as side scan sonar traces, georeferenced multibeam echo sounder (MBES) images, scanned site plans or photomosaics.

Dive Log: dive logs are used to record information about dives. They are often used to tie together objects that have been recovered with location information.

Contact: Information about people associated with the site, such as archaeologists and divers can be recorded in Contact objects

Event: Event objects are used to record things that have happened on site or to the site, such as survey work, excavations and site assessments.

Source: Sources such as documents, reports and letters can be recorded, along with a link to the source if available in a digital form.

Target: Target objects are used to record positions and information about items found during a geophysical survey.

Wreck: information about known shipwrecks and reported wrecks can be recorded in a Wreck object.

Logbook: logbooks can used to record day to day events, ideas, interpretation and thoughts as text documents.

Drawing Object: Drawing objects include points, lines (polylines), rectangles, circles and text. Drawing objects can be used to draw such things as maps, trench outlines, contours and artefacts.

*List of 'objects' supported
by Site Recorder.
© Peter R. Holt*
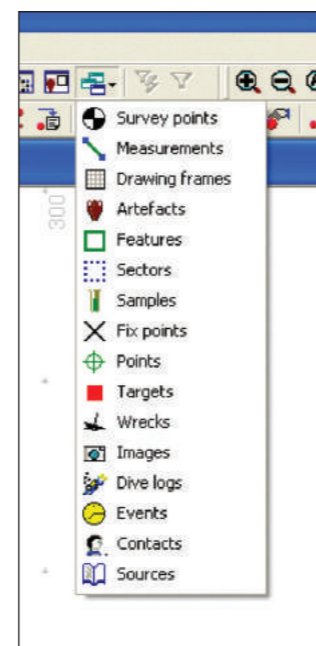
3 Object Hierarchy and Metadata

As well as recording information about objects encountered in a site archive, the schema also specifies ways of grouping objects into hierarchies and ways of defining relationships between objects. This allows the data to be ordered in a structured manner, making it easier to evaluate and navigate through the archive. Generally the grouping is ordered by object type. Stratigraphic grouping is made feasible with all georeferenced objects by the specification of position and orientation for each object.

The schema objects that define hierarchy include the Site, Project and Layer. A Site can contain a number of Projects and each Project can contain a number of Layers. The Layers are used to contain georeferenced objects, such as Artefacts and Survey Points.
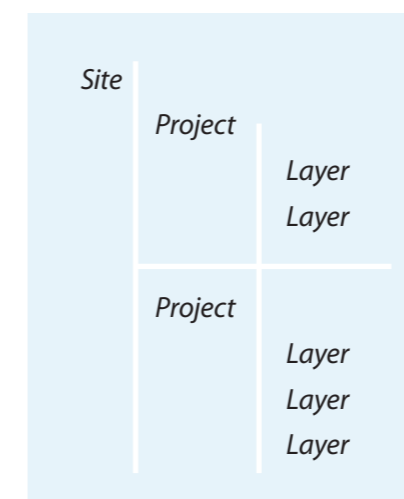
The Site is the main object that represents the ship, monument or structure being recorded. The Site contains one or more Project objects which are usually used to group together data from individual seasons, or from self-contained sets of work, such as a geophysical survey. Each Project can contain one or more Layers. The Layers are used to collect together objects that are associated with each other, most usually by type.

The objects are brought together into collections or families which can be 'owned' by another object. This grouping is a useful way of collecting together similar objects or ones related to each other. The hierarchy of objects forms a 'tree' shape, with the Site at the root of the tree and all the many other objects branching out from it.

Information relating to the site as a whole is also contained within the site object. This includes archive version metadata based on the Dublin Core and geodetic information.

4 Data Management Using Site Recorder

It is necessary to identify the tasks that need to be completed at each phase of the project. From a data management perspective, the project phases include:

- *Project start-up*
- *Pre-fieldwork planning*
- *Fieldwork*
- *End of fieldwork*
- *Post-fieldwork*
- *End of project*

The planning of the project is done before the fieldwork season has started.

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4.1 Project Name

The first step is to give the project a name. Try to avoid names that have been used before, those that are supposed to be humorous or are just too long.

4.2 Location

The next step is to decide on the coordinates of a central location for the work and the extents of the area to be investigated. When the project is centred on a known site this is relatively straightforward, as the position of the site will be known and an estimate of the size can be made. For a project that involves searching for a site, a planned search area has to be defined.

At this point it is important to decide on the coordinates to be used for mapping. Positions can be recorded using your own coordinates local to that site or in real-world coordinates taken from a Global Positioning System (GPS). In the short term it may seem easier to set up your own local grid coordinate system, but this becomes a problem if you want to integrate charts, aerial photographs or geophysical survey data.

Unless this has already been defined for you by the client, the next step is to decide which real world coordinate system to use. In general, it is better to utilize a commonly used coordinate system than something specific, defined for the local area. Often, mapping should be done using the WGS84 datum, as it is a common standard used by GPS receivers and the Universal Transverse Mercator (UTM) projection.

If the site to be recorded is a shipwreck, then it should be possible to add a Wreck object at the best estimate of position for the site. Information about the wreck can then be added to the Wreck object. For other site types a simple Point object can be used to mark its position.

4.3 Site Code

Although not essential at this stage, it is useful to define a code for the site; a unique identifier that is used to distinguish the site you are working on.

4.4 Sharing and Archiving

As soon as the Site file has been created for a project it is important to consider how and where the files will be archived, and the ownership of the information.

Archiving may not seem important in the early stages of a project, but as the information contained within the Site file grows, it becomes essential. Ensure that the archive is backed up on DVD or external hard drive and that copies are made after each significant addition to the archive.

Ownership of the information needs to be decided. Allocate who is to get a copy of the archive and ensure that they get an updated copy after each significant addition to the archive.

Also ensure that the metadata is set correctly before passing on any copies, as this will identify the version of the archive as well as ownership.

4.5 Pre-Fieldwork Planning

4.5.1 Introduction

With the Site file created, information about the site can be added and the fieldwork can be planned.

4.5.2 Importing Existing Information

If a position for the site is known, then charts and maps of the area can be added to the Site file. Charts

and maps help to put the site into context and may give clues about how the site formed and where other parts of the same site may lie. Previous results from geophysical surveys can be included; this may establish a more accurate position for the site or may help define the site extents.

Typically coastline information in vector form can be imported and appears as a collection of Drawing objects on one or more Layers.

Charts can be scanned and added to the site plan as Image Basemap objects.

Targets or anomalies detected during geophysical surveys can be imported as Target objects or added by hand. Side scan sonar mosaics and multibeam (MBES) images can be added as Image Basemaps.

Previous site plans or sketches can be scanned and added to the plan. In some cases, the plans can be digitized and used as the starting point for the main site plan.

Documents relating to the project and site can be added as Sources.

Located or recorded shipwrecks can be added as Wreck objects.

A timeline of important events relating to the site can be created using Event objects.

In general, each dataset or image should be added to its own Layer, with image basemap Layers added to the last or lowest Project, so that they always appear under other objects on the chart.

Permission to use any images or chart data must be obtained before they are added to the dataset. Additional permissions may also need to be sought when publishing or archiving the dataset.

4.5.3 Setting up the Layers and Projects

At the beginning of any project it is advisable to create a set of Layers and Projects. The reason for this is that the lifetime of the project is often not known at the outset and small projects can turn into larger ones. If the Layers and Projects are correct from the start, then they will not have to be changed if the project evolves.

In general, there should be a separate project for each season's work. The name of the Project should include the year and a description, such as '2012 Season'. Within each Project, Layers can be added for each object type as required.

For example, the Layers needed on a typical project in 2012 include:

- *2012 General (for drawings)*
- *2012 Control Points (for survey control)*
- *2012 Detail Points (for survey detail points)*
- *2012 Artefacts*
- *2012 Features*
- *2012 Samples*

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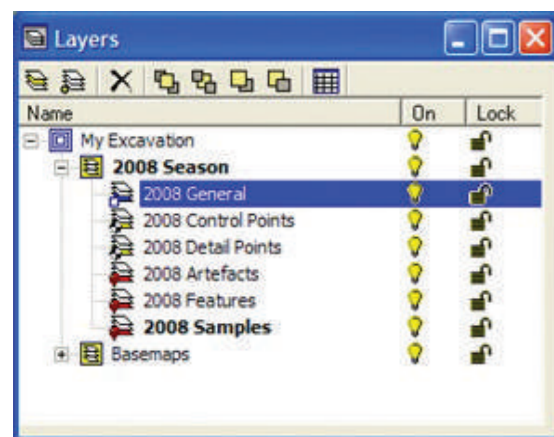
Setting up the project layers. © Peter R. Holt

A separate Layer should also be used for each set of geophysical targets or raw data. In practice, a Site file will contain many Layers within each season's project, each containing a separate type or category of object.

4.5.4 Survey Methodology

It is necessary to agree the survey methodology before any fieldwork starts, so the correct equipment and tools can be sourced and the team trained in the methods to be used.

The task of survey processing can often become the responsibility of the project's data manager, not because of any inherent skill in surveying, but simply because it's a job to be done on the computer. Site Recorder contains the tools needed to process all type of survey measurements underwater, making this task relatively straightforward.

4.5.5 Object Names

The object naming policy to be used on the project should be agreed in advance and documented. Anyone who will be adding data to the system should be trained in its use.

4.5.6 Wordlists

Wordlists and thesauri are used to help maintain consistency within the recording system so need to be set up in advance of fieldwork. The standard wordlists used in Site Recorder can be adapted to suit a particular project.

4.5.7 Adding Contacts

At this stage an interim list of people involved in the project can be added as a list of Contacts.

📖 Suggested Reading

Holt, P. 2007a. *Development of an Object-Oriented GIS for Maritime Archaeology - Motivation, Implementation and Results.* CAA2007. Southampton

Holt, P. 2007b. *The Site Recorder Database Schema.* http://www.3hConsulting.com/Research/research_schema.htm (Accessed October 2011.)

Lledo B. 2004, Field Example of a Database System Applied to Underwater Archaeology, the FileMaker Pro Approach. *TARAUDSTUA Conference.* Bodrum.

Madsen T. 1998. *Design Considerations for an Excavation Recording System, Design and use of Field Information Systems.* CAA-NL98.

Nickerson, S. 1994. A Site Information System (SIS): CADD/Database Integration for Field Use. *APT Bulletin.* 24(1), pp. 56-62

Quinn, R. 2001. The Assimilation of Marine Geophysical Data into the Maritime Sites and Monuments Record, Northern Ireland. *Historical Archaeology.*

5 Fieldwork

5.1 Introduction

Before the fieldwork starts, the Site file for the project should contain all of the information known about the site at that time. In the field, the recording system is used as the repository for all of the information gathered during each dive, but it is also used for day to day planning and decision support.

5.2 Adding Artefacts, Features, Sectors and Samples

Each Artefact is added to the site plan in a position derived from the survey work as it occurs. *In situ* or registration photographs can be imported into SR then digitized to scale, so a 2-dimensional drawing of each find can be added to the site plan. Other photographs and video clips can also be linked to each Artefact.

5.3 Adding Dive Logs

Dive logs should be added on the same day that the dive was completed and any backlog should be avoided.

5.4 Survey Processing

A backlog in survey processing should also be avoided, as the positioning of Artefacts will be dependent on the timely processing of detail survey point positions.

5.4 Data Security

With large quantities of information being added to the recording system as fieldwork progresses, the importance of backing up cannot be stressed enough. Version control is also of paramount importance, especially if the main site file is being copied and shared regularly.

It is essential that the archive is kept free from viruses and other malware. All copies of the archive should be separately checked for viruses when they are created. Copies of the entire Site archive should be copied to an external hard drive or CD at the end of each day. Ensure all copies are clearly marked with their contents, version and date of creation using permanent ink.

Where possible, a separate external hard drive should be used for the online backup so if the main computer hard drive fails, the online backup should survive. The data recovery procedure (to be used after data loss) should be tested periodically to ensure that it works in practice.

File archiving should be used for all important projects. The Site file version should be updated each time the file is backed up. All computers being used to add to the archive must have up-to-date antivirus software installed.

5.5 Large Project Operation

When working on large projects, it may become necessary for more than one person to add information to the recording system at the same time. Fortunately, this can be done by using the merge tool available within Site Recorder.

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6 End of Fieldwork

At the end of a season or project, the information should be verified, published and archived. All meta-data should be checked and updated. Copies of the dataset should be given to the recipients agreed at the start of the project. A copy of the archive should be placed in long term secure storage and a separate copy kept by the project team.

Suggested Reading

- Holt, P. 2010. *Site Recorder Exercise Book*. http://www.3hconsulting.com/Downloads/SiteRecorder4Exercise-Book.pdf (Accessed February 2012.)

Appendix Summary

Site Recorder was chosen to support the dive teams in their work underwater. The working of the system is explained in early units of the course and additional help from the trainers is given during the practical dive session. Like most applications, it is important get 'hands on' experience to begin to understand how to use them. Site Recorder is no different. Experience during the field schools has shown that some of those students with a good level of computing knowledge progress quickly, others more slowly. This appendix on Side Recorder has, therefore, been written to support trainers and students while working with it.

Suggested Timetables

90 mins	Review of 2-Dimensional Survey Techniques and Introduction to 3-Dimensional Survey Techniques (NAS)
	Break
30 mins	Introduction to Site Recorder (3H) – Theory
60 mins	Site Recorder Practical Exercises (Using the SR Workbook)
	Break
90 mins	3-Dimensional Site Survey Practical Exercise
	Break
30 mins	Continue 3-Dimensional Site Survey Practical Excercise
60 mins	Process the Results of the 3-Dimensional Site Survey
	Break
90 mins	Continue Processing the Results of the 3-D Site Survey
	Break
60 mins	Student Group Presentations of the Results and Discussion
20 mins	Concluding Remarks and Closure

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Teaching suggestions

This appendix introduces students to using Site Recorder in preparation for the practical dive session in Unit 12. Trainers should use a series of lectures and training exercises, before asking the students to apply their knowledge in a practical task. It is expected that trainers will use the generic presentations found on the NAS Teaching Pack Tutor CD. Included below are the file source codes for each of the teaching units that can be found on the NAS Teaching Pack Tutor CD.

Additional information on Site Recorder can be found at 3H's website. From here, trainers can download a variety of resources including a demonstration version of the software, presentations, work books and training exercises.

Introduction to 3-Dimensional Site Survey Techniques (NAS): What to Use
- *PowerPoint presentation: P1 Session 5 3D Survey*
- *Trainer's notes file: F:/part1_powerpoints.html*
- *PowerPoint presentation: P1 Session 7 Creating a 3D Plan - Starting to Plan a Site*
- *Trainer's notes file: F:/Part_1/PISession_7.pdf*

Introduction to Site Recorder: What to use
- *PowerPoint presentation: P1 Session 7 Creating a 3D Plan - Starting to Plan a Site*
- *Trainer's notes file: F:/Part_1/PISession_7.pdf*
- *Technical notes about survey principles can be found at:*
  http://www.3hconsulting.com/techniques.html (Accessed February 2012.)

Preparing for Practical Sessions

Site Recorder (demo mode) can be downloaded from: http://www.3hconsulting.com/index.htm (Accessed March 2012.)

The *Site Recorder Exercise Book* is located in the file C:\Program Files (x86)\3H Consulting\Site Recorder\Documents created during the installation of the software application or can be downloaded from: http://www.3hconsulting.com/downloads.html (Accessed March 2012.)

For the Using Site Recorder practical sessions it is preferable to use hard copies of the *Site Recorder Exercise Book*. Ideally two students will share one computer, so one copy per pair of students is required.

NB. Although it is possible that every student will have a personal computer and perhaps prefer to work alone, an already challenging session is likely to get even more complicated with everyone working at slightly different speeds.

Practical Sessions

There are two options for trainers to teach students how to use Site Recorder. Which they choose will depend on an assessment of the average level of computing skills of the students and the availability of sufficient notebook PC's to enable students to follow the exercises.

Option 1

The most straightforward way to teach the use of Site Recorder (particularly with a group of twelve or more students), is to demonstrate each of the selected exercises from the 3H Site Recorder Exercise Book and verbally explain each step of the process, projecting the steps onto the screen. Trainers can use either the UNESCO licensed copy of Site Recorder or Site Recorder (demo mode), which does not require a USB key.

Suggested exercises:

1. *Add an object (pp. 9)*

2. *Projects and layers (pp. 11)*
   a. *Modify the layers*
   b. *Showing and hiding layers on the chart*
   c. *Setting the layer for an object*
   d. *Locking layers*

3. *Setting up the site (pp. 14)*
   a. *Modify the site*

4. *Using the find tool (pp. 15)*

5. *Adding survey points and measurements (pp. 28)*
   a. *Create a new site*
   b. *Add four survey points*
   c. *Add six distance measurements*

6 *Basic adjustment (pp. 30)*

7. *Finding mistakes (pp. 31)*

8. *Radial measurements (pp. 32)*

9. *Offsets and ties (pp. 33)*

Additional exercises if time is available:

10. *Adding a drawing frame (pp. 38)*

11. *Adding a preliminary sketch (pp.17)*

12. *More about drawing (pp. 21)*

13. *Adding a base map (pp. 25)*

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Option 2

An alternative option is to demonstrate each of the selected exercises, with the students following each step on their own computer. Although this is more challenging for the trainer, there is the significant benefit that everyone has the opportunity to begin to get practical experience.

Some students will be competent enough to proceed through the exercises at their own speed with little or no assistance from the trainer, the average will cope quite well with help from the trainer or the most skilled students, but some will find the exercises difficult. The trainer should be ready to assist those who are unable to follow the instructions.

Each of the students wanting to use their own computer will need to download the software application from 3H's website. This download is actually the full version of the software, but without the key supplied with each license it will only work in demonstration mode, which reduces its functionality, but allows all of the exercises to be completed. Trainers should note that once the software has been installed, copies of the Manual and *Site Recorder Exercise Book* are located in the computer folder: C:\ Program Files (x86)\3H Consulting\Site Recorder\Documents.

To avoid delays during the allotted teaching time, trainers should remind students a day or two before that they need to download the software and check that it is installed and will open.

This is the preferred option, but the trainer needs to be flexible in terms of what can be achieved and to expect periodic interruptions, as students will inevitably not follow the exercises at the same speed or will inadvertently use the wrong computer keyboard command.

Students practice using Site Recorder. © Christopher J. Underwood

Dry 3-Dimensional Survey Practical Exercise

Once the students have mastered the use of Site Recorder it is important to put their skills to use in a survey practical exercise. The objectives of this exercise are for students to plan and carry out a 3-dimensional survey and process the results using Site Recorder.

The students are divided into teams with each team working on an artificial 3-dimensional site. Six students in each team is an ideal number, as it allows three pairs to work simultaneously.

For each site the following is required:

• *Objects such as tables and chairs can be used to represent large 3-dimensional artefacts or structures*

• *A minimum of twelve additional artefacts*

*ABOVE: 3-dimensional survey practical set up.
© Christopher J. Underwood*

*LEFT: Control points should be placed above and around the site to provide a better 'line of sight' for measurements.
© Christopher J. Underwood*

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LEFT: Taking a direct survey measurement from a control point to a detail point on an artefact. © Christopher J. Underwood

*BELOW: Each team present the results of their 3-dimensional survey.
© Christopher J. Underwood*
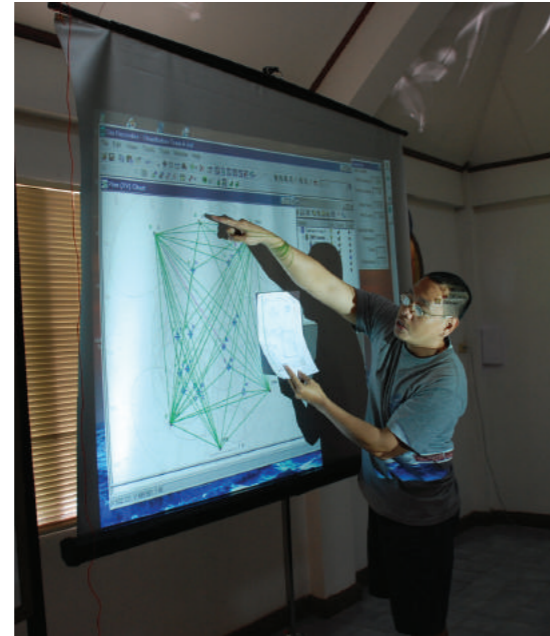
Alternatively a real site can be used, but the logistics are likely to be more complicated and it will not necessarily improve the teaching environment or the results of the exercise.

Equipment required for each team

- *3 x 10 metre tape measures (allowing 3 pairs to take measurements)*
- *6 x control points (to be fixed in position around and higher than the objects to be surveyed. Tape, cable ties or light rope can be used)*
- *3 x A4 boards*
- *3 x pencils and erasers*
- *Drawing grid/planning frame*
- *Recording forms for the survey*

Site Recorder recording forms are located in:

C:\Program Files (x86)\3H Consulting\Site Recorder\Documents. They can also be downloaded from http://www.3hconsulting.com/forms.html (Accessed March 2012.)

Alternatively NAS recording forms are located on the NAS Teaching Pack Tutor CD.

Trainer's notes file F:/introduction_course/Proforma_planning%20frame.pdf

Plotting the Results of 3-Dimensional Survey: What to use

Trainers should use Site Recorder (demo mode) to facilitate this practical session.

Student objectives:

- *Transfer the survey results to Site Recorder*
- *Understand the reasons for and characteristics of typical errors*
- *Understand the need to plan a survey*
- *Present each of the team's results to the class*

Trainers should expect varying levels of achievement. It is also possible that the teams may not complete the processing within the available time.

To follow up the teams can be encouraged to:

- *Complete the data entry from 3-dimensional survey*
- *Enter the results of the 2-dimensional surveys carried out earlier in the week*
- *Continue to work through the remaining exercises in the Site Recorder Exercise Book*

📖 Suggested Reading: Full list

Bowens, A (ed.). 2009. Underwater Archaeology - *The NAS Guide to Principles and Practice,* Second Edition. Blackwell Publishing

Holt, P. 2007*a. Development of an Object-Oriented GIS for Maritime Archaeology - Motivation, Implementation and Results.* CAA2007. Southampton

Holt, P. 2007*b. The Site Recorder Database Schema.* http://www.3hConsulting.com/Research/research_schema.htm (Accessed March 2012.)

Holt, P. (2010). *Site Recorder Exercise Book.* .http://www.3hconsulting.com/Downloads/SiteRecorder4Exercise-Book.pdf (Accessed March 2012.)

Lledo, B. 2004. Field Example of a Database System Applied to Underwater Archaeology, the FileMaker Pro Approach. *TARAUDSTUA Conference.* Bodrum.

Madsen, T. 1998. *Design Considerations for an Excavation Recording System, Design and use of Field Information Systems.* CAA-NL98

Nickerson, S. 1994. A Site Information System (SIS): CADD/Database Integration for Field Use. *APT Bulletin.* 24(1), pp. 56-62.

Quinn, R. 2001. The Assimilation of Marine Geophysical Data into the Maritime Sites and Monuments Record, Northern Ireland. *Historical Archaeology.*