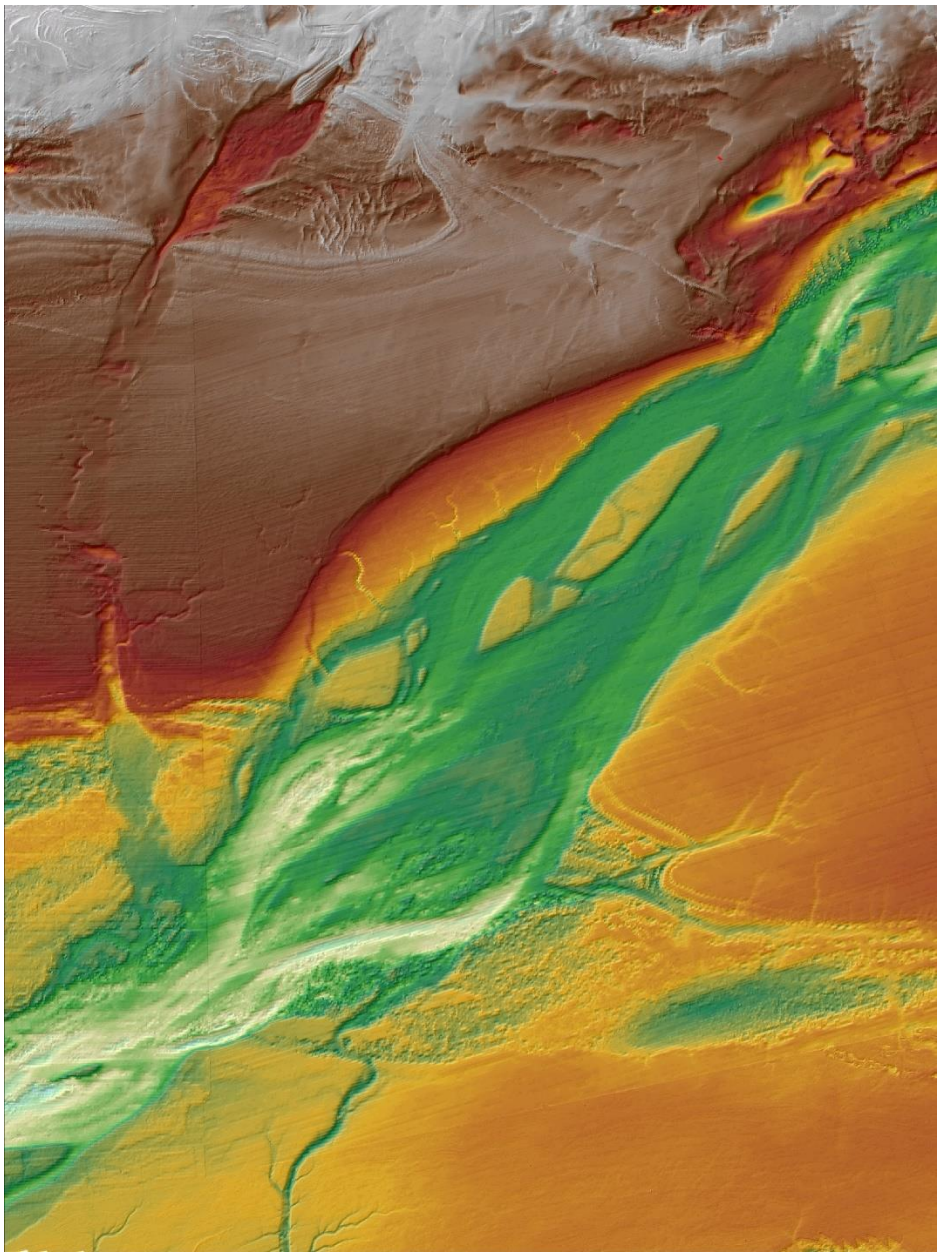
7376: Marine survey training course for archaeologists

Training Course, Feedback and Future Development

By Michael J. Grant, Justin K. Dix and Fraser Sturt

16th March 2017



Prepared by: Coastal and Offshore Archaeological Research Services (COARS), Ocean and Earth Science, National Oceanography Centre Southampton, University of Southampton, European Way, Southampton, SO14 3ZH, United Kingdom. www.southampton.ac.uk/coars

UNIVERSITY OF Southampton

Title: 7376: Marine survey training course for archaeologists: Training Course, Feedback and Future Development	Status: Final Draft Version
Authors: Main contact: Michael Grant, M.J.Grant@soton.ac.uk Ocean and Earth Science, University of Southampton, SO14 3ZH Justin Dix, J.k.dix@soton.ac.uk Ocean and Earth Science, University of Southampton, SO14 3ZH Fraser Sturt, F.Sturt@soton.ac.uk Archaeology, University of Southampton, SO17 1BF	Summary of changes:
Derivation: Final Version	Still to add:
Origination Date: 10/02/17	Circulation: Historic England
Reviser(s): MJG	Required action: N/A
Date of last revision: 16/03/17	File name: 7376_CourseReport_20170316
Version: 1.0	Approval: HE

Cover image: Bathymetry of the Palaeo-Solent and Northern Palaeochannel, English Channel. Contains public sector information, licensed under the Open Government Licence v3.0, from UKHO Bathymetry DAC. Not to be used for navigation.

Table of Contents

Figures

Summary

In January 2017 a marine survey training pilot course, commissioned by Historic England (Project 7376) was designed and run by COARS, University of Southampton, at the National Oceanographic Centre.

This project will build upon the January 2015 pilot course (project 6205) by delivering training to develop a broader range of skills in marine survey techniques. The training course also complied with Historic England External Training Strategy 2015-18 and the Historic England Action Plan 2015-18.

The two day course, led by instructors from COARS, University of Southampton, and Historic England provided training in the use of marine geophysical survey techniques, focusing upon using such data to satisfy current legislation, standards and guidelines relating to underwater heritage. The focus was upon the two principle underwater archaeological resources: (1) wreck sites (i.e. sunken ships and aircraft) and any material associated with such vessels; and (2) landscapes and sites, predominantly prehistoric but also more recent structures (e.g. harbours and quays), inundated by rising sea levels. The course contained a large computer practical component providing the opportunity to develop knowledge, skills and practical experience in marine survey analysis methodologies, and the type of information that can be gathered from different data sources.

The training course took place between the 25th and 26th January 2017 and was attended by ten participants, including attendees from Cyprus and Egypt. The course consisted of two days of classroom and computer-based instruction in marine survey. Feedback from course participants has indicated that this training course was a success with all attendees who felt they were better informed to advise and / or oversee marine archaeological investigations utilising marine geophysical techniques. The feedback from the training course indicate that it is meeting a training, and capacity building, requirement within the heritage sector and there is demand for it to be offered again at a later date.

1 Background

In England, Historic England (HE; and their previous role as English Heritage) has provided advice for marine development projects since 2002, witnessing a large expansion of seabed development projects which include the acquisition of marine geophysical data to support project design and completion of Environmental Impact Assessment (EIA) exercises. To educate individuals and companies, engaging with the marine environment, HE have produced a number of Guidance Documents (e.g. BMAPA and EH 2003; Dunkley 2008; English Heritage 2006; Firth 2013; Trow and Murphy 2003; Plets et al. 2013). Recently, Dix and Sturt (2013) published a chapter on *Marine Geoarchaeology and Investigative Methodologies within the Maritime Archaeological Research Agenda for England,* providing a review of techniques available for offshore geoarchaeological investigations at a range of spatial scales, and identifying key research areas for the future. However beyond the available guidance literature, opportunities for classroom-based teaching, including practical components, are limited outside of structured university training courses.

A key role for Historic England is to deliver their Action Plan priorities (2015 – 2018) which includes capacity building within the sector engaged in understanding, protecting and managing the historic environment. Within their current Corporate Plan, Aim 2 (Identify and protect England's most important heritage) focuses on the delivery of training that enables curators and other key stakeholders to identifying heritage assets (e.g. geophysical anomalies) and evidence about environmental change (e.g. geotechnical analysis). In September 2013 English Heritage produced *Historic Environment Workforce: Training Delivery Strategic Approach.* This document set out their approach to training delivery and focus in terms of meeting gaps in knowledge and skills identified through recognised labour market intelligence and the action necessary to support particular audiences. It is therefore recognised that facilitating training is one of the key contributions Historic England makes to building capacity in the historic environment sector. Historic England commissioned in 2014 a pilot marine geotechnical survey course for archaeologists as they identified this topic as strategic training requirements and that a skills shortage existed. The design and content of the course was led by Labour Market Intelligence (LMI) conducted by COARS (Grant et al. 2014) but maintained a focus upon geotechnical approaches (although a computer-based practical session on marine geophysics was included). From the feedback from the course, existing LMI and conversations held between Historic England and the sector, it was identified that there was an additional training need focused solely on the marine survey methodologies.

Historic England have limited capacity to deliver their own training programmes and seek to work in partnership with other organisations to promote the development of technical courses which build and maintain professional standards in the sector. As a result, COARS were commissioned on the 4th March 2016 to design and run, in partnership with Historic England, a training course to address identified skills shortages in the understanding, interpretation and use of survey data obtained for the coastal and marine development projects. The training course sits within the Historic England Programme Board: Heritage Expertise and the commissioned training programme was developed in partnership with Historic England's subject matter experts and Strategic Planning Management in order to ensure a high quality product that matches our corporate requirements and priorities.

The following audience groups were identified in the Historic Environment Workforce: Training Delivery Strategic Approach and are considered to be in scope for this project:

- curatorial roles (local authority Historic Environment Services) – those who look after, in a management context, the historic environment such as Archaeological Curators;
- commercial marine survey contractors – those that are commissioned by developers and associated consultants to acquire survey data to address engineering parameters, but will not be directly familiar with how those data are used by archaeologists; and
- archaeological units and commercial heritage consultants – those who undertake the analysis and interpretation of marine survey data obtained by third parties.

2 Project Scope

Historic England's learning standards and methodologies, as set out *in Historic England's External Training Strategy 2015-18*, requires a training programme / scheme / course to meet at least two of the following tests:

- Audience(s) – it must reach or support an identified and priority audience as set out in the Historic England Corporate Plan and Action Plan;
- Skills needs and shortages – it must meet a skills need or shortage identified through Labour Market Intelligence (LMI);
- Topic – it should relate to topics identified as a priority through Historic England's Action Plan or programme of advice and guidance; and
- Expertise sharing – it should relate to the expertise available from within Historic England, which they are able to deploy.

The proposed training course meets the first three tests, as set out previously by the LMI undertaken by Grant et al. (2014) and the Historic England Corporate and Action Plans, as stated above. The project was delivered in three phases:

1. Design - of the pilot training course and an appropriate toolkit of supplementary training materials which meets the needs of the audience and delivers the content they need to cover (this report).
2. Delivery of pilot course (reported within this report)
3. Evaluation - production of a report evaluating this approach and recommending any future actions (this report).

Specific aims and objectives were identified for the project and are detailed below.

3 Project Aims:

- To develop the knowledge, skills and appreciation of how marine geophysical survey data is obtained, processed and interpreted within the coastal and marine environment
- To reach a target audience comprising heritage practitioners in curatorial, investigation and research roles, staff in archaeological units, commercial heritage consultants and professional marine survey contractors.

4 Objectives

The project will:

1. Provide an understanding of the skill shortages that exist in the sector; demonstrating clearly who the audience is, what level of demand there is for training and what specific content the training should cover (Grant et al. 2014);
2. Deliver a pilot training course to meet the skills shortages which will include the development of a learning toolkit to supplement the training;
3. Provide a learning environment that includes access to written learning materials, expert speakers, practical laboratory demonstrations, discussion opportunities and, where it meets the learning needs of the delegates, and access software used in handling coastal and marine survey datasets;
4. Develop practical experience and understanding of handling marine survey datasets for archaeological purposes;
5. Explain how marine survey archaeological reports should effectively identify risk and inform the selection of viable mitigation strategies; and
6. Provide an evaluation of the effectiveness of the pilot in bridging skills shortages and provide options for future delivery.

5 Identified audiences.

The following audience groups have been identified in the *Historic Environment Workforce: Training Delivery Strategic Approach* and are considered to be in scope for this programme:

- Curatorial roles (local authority Historic Environment Services) – those who look after, in a management context, the historic environment such as Archaeological Curators;
- Commercial marine survey contractors – those that work on behalf of developers to acquire geotechnical survey material to address engineering parameters, but will not be familiar with how the same material is used for geoarchaeological interpretation;
- Parties that undertake invasive and non-invasive investigation for assessment, recording and analysis on sites or assemblages produced from sites with archaeological interest – those who undertake fabric analysis for identification, analysis, survey and evaluation such as staff in archaeological units and commercial heritage consultants; and
- HE staff, primarily within National Planning and Conservation Department, whose role involves advising on coastal and marine development projects.

6 Method Statement

Stage 1: Project initiation meeting

A project initiation meeting was held with Historic England on the 28th June 2016. During this meeting the proposed course outline for the 2017 training course was discussed, and a revised version was designed in conjunction with Historic England based upon LMI and the results of the 2015 Pilot Training Course run at the University of Southampton.

Course advertising and enrolment

Following agreement over the revised course designed, the training course was formally made available for bookings in October 2016. The course was advertised through the COARS and University of Southampton websites, and details distributed to the CIfA Marine Archaeology Special Interest Group, Association for Environmental Archaeology (AEA), Quaternary Research Association (QRA), Association of Local Government Archaeological Officers (ALGAO), Nautical Archaeology Society (NAS) and by Historic England, both internally and externally. Course enrolment was administered online through the University of Southampton Online Store (https://store.southampton.ac.uk/).

7 Course Attendance

Nine participants registered for the two day training course. Those enrolled on the course included two from local authorities, one representative from the British Geological Society, one consents manager from an offshore developer, one from an archaeological consultancy, three researchers and one other interested party. Attendance from Historic England was only in an observer capacity with no staff formally signing up to attend the course. The majority of course attendees were from the United Kingdom, including representatives from Scotland and Wales, though two were from outside the UK including one from Cyrus and another from Egypt

8 Course Content

The two day training course was divided into eleven sessions spread over two full days (see Appendix A). This consisted of 13.25 hours of training including 7 hours of computer practical. Prior to course commencement each participant was provided with pre-course material, which included a copy of the Historic England Guidance on Marine Geophysics (Plets et al. 2013).

Day 1: Tuesday 25th January 2016

Session 1: Introduction: What are marine surveys, the UK legislative framework, archaeological expectations of offshore investigations

After an introduction by Dr Michael Grant outlining the two day course, Dr Fraser Sturt and Dr Christopher Pater (Historic England) provide an overview of what marine surveys are and why they are undertaken, what constitutes the archaeological record, the UK legislative and planning framework, and the maritime archaeological process.

Session 2: Introduction to Marine Geophysical Techniques

This session, led by Dr Justin Dix, provided an introduction into the range of techniques available for marine geophysical survey for archaeological purposes. The session covered topics including coordinate systems and projections, vessel positioning, geophysical sources (including bathymetry, side scan sonar, sub-bottom profilers and magnetometery) and system specifications

Session 3: Survey planning

Dr Michael Grant led a session on survey planning, focusing on the following topics of identifying project aims and pre-survey assessments, open-access data sources, determining archaeological potential, survey requirements for different projects / development types and data resolution requirements and surveying requirements

Session 4: Wreck site investigations: Computer Practical 1

Dr Justin Dix led a computer-based practical session focused on the use of bathymetry data, derived from the MCA CHP Programme, focused on the area of the Godwin Sands, off the east Kent coast. ArcGIS was used to bring together multiple datasets, including wreck databases, enabling attendees to use time-lapse datasets, manipulation of bathymetry data using GIS tools to enhance site visibility and interpretation, and interrogate this data alongside other datasets such as sediment transport and tidal strength and direction.

Session 5: Wreck site investigations: Computer Practical 2

Dr Justin Dix led a second computer-based practical session focused on the use of bathymetry data for high-resolution single-wreck investigations, this time using the point-cloud dataset. ArcGIS and Cloud Compare software were used to investigate the wreck site HMS Vanguard (1875) using bathymetry data from both INFOMAR and bathymetry data collected aboard the RV Celtic Voyager in 2015 as part of the *World War I shipwrecks in the Irish Sea* project (led by Ruth Plets, Ulster University). The session enabled attendees to compare different resolution bathymetry data, as typically supplied to archaeological contractors, and how this can influence archaeological interpretation.

Day 2: Wednesday 26th January 2016.

Session 6: Submerged Palaeolandscapes.

Dr Fraser Sturt provided an introductory lecture on submerged palaeolandscapes, focusing upon what they are, their history of exploration within British waters, sea-level history and changing palaeogeography, and approaches to modelling palaeolandscape potential.

Session 7: Palaeolandscape: Computer Practical 1

Dr Justin Dix led a computer-based practical session using bathymetry and sub-bottom boomer data to explore and identify palaeolandscape features in the southern North Sea, using the software Petrel. The practical utilised data derived from the Gabbard OWF held by the Crown Estate Marine Data Exchange.

Session 8: Palaeolandscape: Computer Practical 2

Dr Michael Grant led a second computer-based practical focused on identifying palaeolandscape features associated with the palaeo-Solent river, using the software ArcGIS and Petrel. The study area, stretching from the Solent out to the Northern Palaeochannel in the central English Channel, described with attendees being guided through the bathymetry dataset to identify key palaeolandscape features on the surface, along with comparison to previous mapping of the Solent valley such as the English Channel REC. Part of the study area was then further interrogated using sub-bottom data in order to identify palaeochannel features not visible within the bathymetry dataset. Attendees were instructed how to create a 'picked' seismic horizon and then, utilising multiple survey lines of data, generate a 3D model of the sub-surface topography. They were then instructed how to import such surfaces into ArcGIS in order to compare these with the bathymetry data, compare these against current mapping of the palaeo-Solent drainage, and subsequently present this data within a report.

Session 9: Identifying archaeological potential and mitigating impact: Computer Practical

Dr Michael Grant led a computer-based focused on how to identify archaeological potential and mitigate the impact of development upon features with archaeological potential upon the seabed. Within ArcGIS bathymetry, side scan sonar and magnetometer data, obtained from the Crown Estate Marine Data Exchange for the proposed Atlantic Array OWF site in the outer Bristol Channel, was used as the case study. The difference between archaeological potential and significance was explained and then the case study area was interrogated in order to identify geophysical anomalies. The attendees were talked through each anomaly and encouraged to use the GIS to compare the different datasets in order to identify what the anomalies might be, focusing on the use of multiple data sources in order to strengthen confidence in deciding whether a feature is of archaeological or natural origin. This also helped to highlight issues such as spatial uncertainties within different datasets. Following this, an explanation of what Archaeological Exclusion Zones are, their purpose, and how they should be generated and applied was given, using the case study to illustrate their application.

Session 10: Post survey archaeological investigations, including geotechnical and wreck investigations

Dr Michael Grant led a discussion over approaches on how marine survey results should be reported, including the contents of the report and need for careful data archiving. Techniques for post-survey investigation were also illustrated, including drop down camera / ROVs, divers, additional targeted surveys and geotechnical investigation.

Session 11: Final discussion

The final session of the day was an open discussion over the content of the two days and an opportunity for the students to ask questions over any of the content covered. During this discussion further information on additional targeted geophysical surveys was provided, such as the use of 3D Chirp for small object identification.

9 Course Feedback

After the course all participants were contacted to provide feedback on the training course through the University of Southampton's iSurvey portal (https://www.isurvey.soton.ac.uk/; shown in Appendix B). Eight course participants provided feedback, with the results synthesised below.

Personal details

Attendees were distributed across the four job roles identified within the questionnaire, with half of the respondents falling into the job role category 'Investigation and Research' and curatorial roles making up a quarter of respondents. In relation to the sector associated with their job, archaeological curators, Researchers (university or freelance) and 'other' each made up a quarter of the respondents, with only single respondents in the sectors of developer and archaeological contractor.

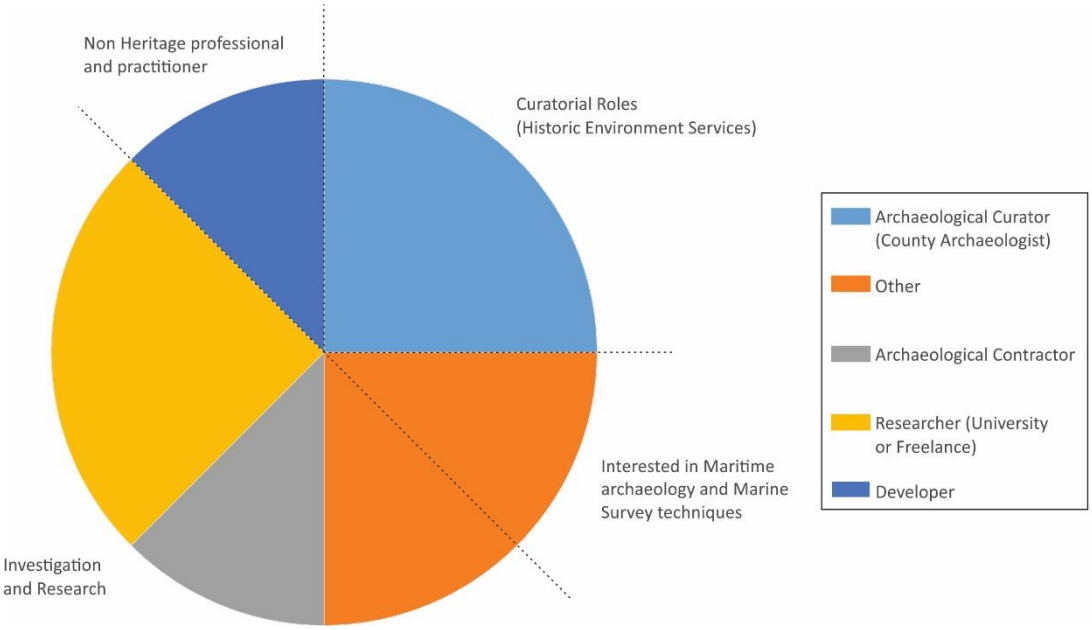


Figure 1: Job category and specific role of course attendees who responded to the course feedback questionnaire.

Course rating and knowledge gained

Respondents rated the course as being either excellent (five participants) or very good (three participants). All eight respondents indicated that they had benefitted from the course and increased their knowledge of the subject. Prior to the course participants rated their knowledge between poor and good (two participants in each rating), with one stating it was good and another saying they had no knowledge of the subject. After the course seven participants indicated that their knowledge level of the subject was good and one participant felt that it was now excellent. This indicates a positive distance travelled by the majority of participants in respect to increasing their knowledge of the subject area.

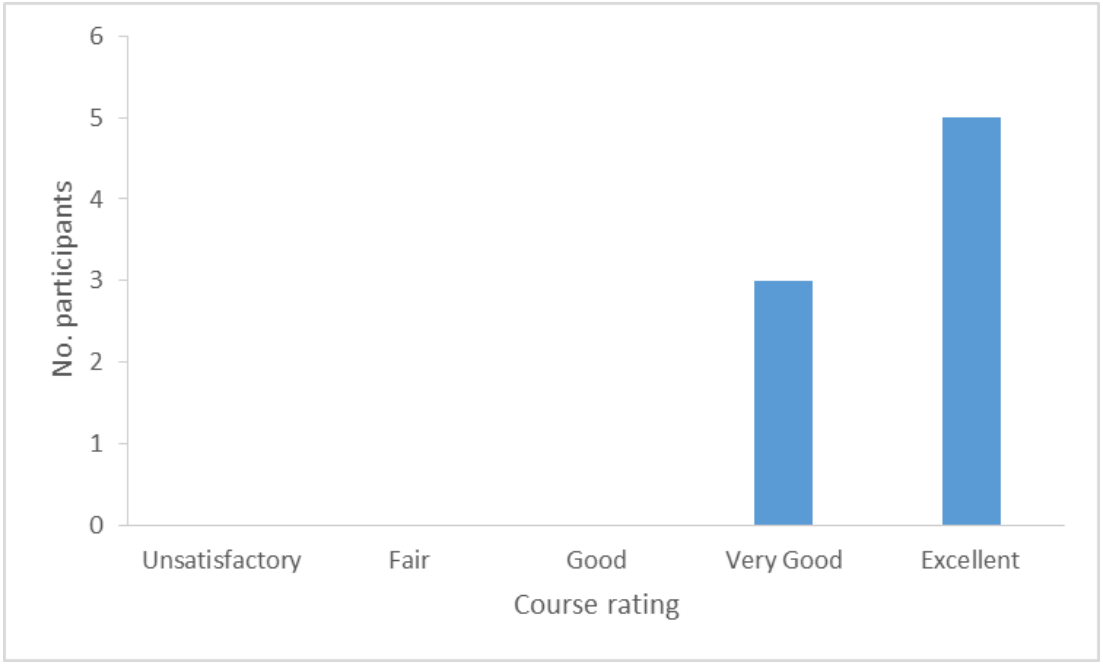


Figure 2: Training course rating by attendees

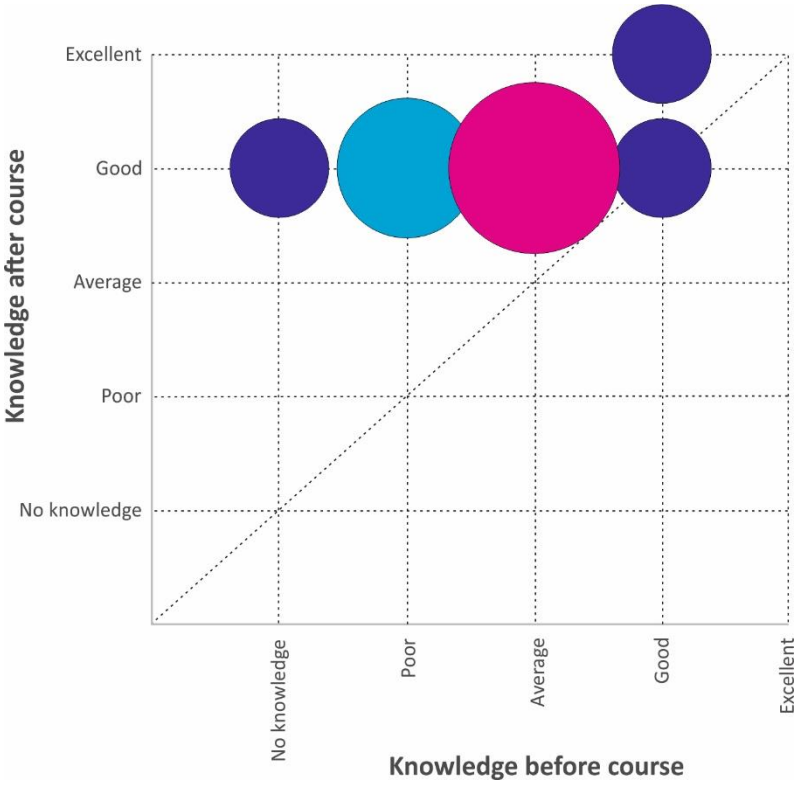


Figure 3: Distance travelled by course attendees, showing their knowledge progression before and after the course.

The quality of the lecture and practical components were all rated as either excellent or good, with the highest ratings for the practical (computer) components.

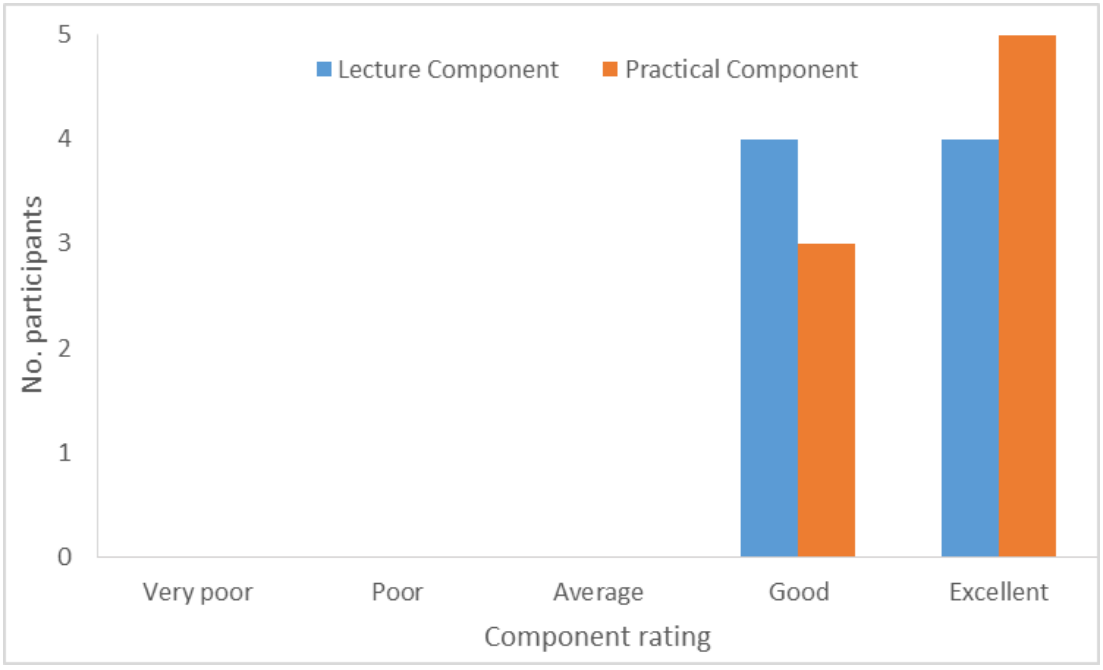


Figure 4: Rating of the lecture and practical components of the course

Strengths of the course.

Each participant was encouraged to freely express what they felt were the strengths of the course. Many commented on the extensive knowledge of the course instructors, the suitability of NOCS as the course venue, and the course structure consisting of a mix between lecture and practical sessions, with the practical sessions often providing the highlight sessions. Many commented on how the short course was well-structured to provide a compact learning experience to transfer a wide range of different skills and techniques within the limited amount of time available. The use of 'real data' for the practical components, including a wide range of different forms of geophysical survey data, and from a wide range of geographical areas (with different local seabed and geological conditions) was also praised allowing participants to gain experience of the variability of survey data, including a variety of data resolutions. It was also acknowledged that the course participants had varying degrees of pre-course experience and abilities, and that the course leaders acknowledged this and made adaptations to the course in order to keep everyone engaged and, where required, provided additional support during practical sessions.

Course Improvements

As stated above, the highlight of the course was the practical sessions and there was a desire by some that the course could have been one or two days longer in duration, including the opportunity to visit a research vessel or an additional practical session such as putting the acquired knowledge into practice through the assessment of a mock development. Another suggestion was that the course could be split into two sections, one focusing on technical aspects and the other on policy, with participants able to sign up to these individually (or collectively).

Benefits of the course: learning

Each participant was asked to reflect on what they felt they had learnt during the course. Many commented on how the course had provided them with a greater understanding of marine survey techniques and, where the attendee already had this information, provided a good refresher to ensure they were up to date with current practice and current technological. The policy components were also highlighted as a benefit, especially for those in curatorial roles, and also helped to outline Historic England's expectations for marine surveys.

The course also helped to outline the practicalities of undertaking a marine survey and the practical limitations (and methods to overcome / improve them) in relation to data quality and spatial accuracy. This also included the need for early dialogue with surveyors over survey requirements and data expectations (including processing), and how data can be analysed / used to feed into the development process for offshore projects. The demonstrations on the use of marine geophysical data was also highly valued, especially the importance of combining bathymetric and sub-bottom profiler datasets, and analytical techniques now available to enhance this process in order to understand relic palaeolandscape features. The need to better integrate the results of marine geophysical and geotechnical investigations, and how these two approaches enhance each other, was also recognised by many participants. There was also the realisation by some participants of the need for sub-bottom profiling rather than a reliance upon bathymetric (and side scan sonar) surveys solely to infer possible palaeolandscape relic features.

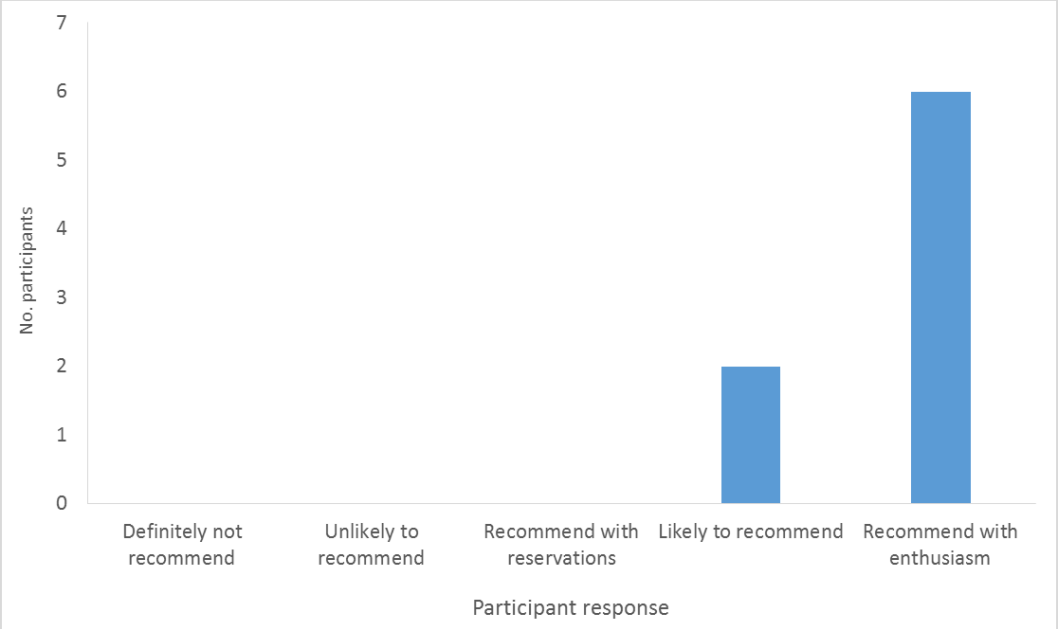


Figure 5: Response when asked if attendees would recommend the course

Benefits of the course: current job role

Participants were asked to provide comments on how they felt this course had directly benefited their current job. With the exception of the archaeological contractor, the participants felt that the course had better equipped them to work with marine projects. Participants from with a job role defined as developer or archaeological curator stated that the course had better equipped them to understand the work packages that they are involved with, provide better advice to their marine consent team, and generally be more informed when dealing with marine developments. This included expectations of what an archaeological assessment should include and the policy / legislation that governs such work, in order to provide permission for offshore development. Those working within a research role stated that the course would provide them with a greater understanding of how to undertake investigations of submerged landscapes. It was also highlighted that the course was useful for understanding the differences in approach between archaeological contractors.

Course recommendation

Participants were asked whether they would recommend the course. Three participants stated that they were very likely to recommend the course with five stating that they would recommend a future course with enthusiasm.

Future developments and recommendations

The feedback received on the two day training course was very positive and clearly demonstrates the usefulness of such training opportunities. Overall it has shown that the experience of this pilot course was positive, worthwhile and has helped to fill a training gap requirement that was identified both at project inception and through the Market Intelligence Gathering Exercise (Grant et al. 2014). The feedback implies that the course was pitched at the right level for a wide audience, and while some participants found certain aspects more difficult than others, they did comment that the course leaders were able to adapt the course content and teaching environment to help cater for this so that nobody was left behind. The suggestion of extending the course over three or four days would permit

the course to progress at a slower, less intense, pace that would favour all candidates. Clearly for this to occur it is necessary to keep the attendance cost at a minimum so that the widest possible audience can afford to attend, especially those within job roles where funds available for training are most constrained. However there is always an inherently higher cost in running an event for the first time and, over time, it is anticipated that the course fee could be reduced as areas of cost saving can be identified. The balance of practical and lecture-based teaching was deemed to be at the correct level by participants, and did enable them to gain experience of a range of software for looking at different data sources. In a similar response to the marine geotechnical training course, there appears to still be a general poor understanding of the wide range of datasets that are freely available covering the marine environment that should be used to enhance marine archaeological assessments.

There was a low uptake for the course from marine developers who were one of the principle target audiences. Those contacted directly explained that they felt they already knew enough about marine survey to negate the need for attending the course. Similarly it was unfortunate that no one from Historic England signed up to attend the course (beyond the course observer), especially as many of their staff (such as regional science advisors) would often be involved in marine developments. Encouragement of these groups to attend any future course should be encouraged in order to make such a course sustainable for the future.

Lessons learnt and Project Evaluation

The preparation and execution of the course, coupled with feedback from attendees, indicates that the project Aims and Objectives were met. Most notably it was possible to attract participants from the non-Heritage professional / practitioner, Curatorial Roles and Investigation and Research sectors. However the uptake from the non-Heritage professional / practitioner sector was low, even though they were contacted repeatedly by Historic England to alert them to the course and its benefits for ongoing offshore developments.

The use of automated online systems for the course administration was instrumental in the successful delivery of this project and, most notably, the assimilation of the course feedback. The course feedback suggests that future running of the course would not require significant changes to ensure its success, and the joint running of the first session between COARS and Historic England staff was seen as a distinct advantage of the course.

10 Conclusions

Project 7376 has presented a unique learning opportunity in marine survey that uniquely accompanies Historic England's existent guidance on Marine Geophysics. This has meant that a larger practical component to the course could be adopted to allow participants hands-on experience of real-world datasets in order to understand the application of the existent guidance and a greater recognition of the challenges of marine surveys and how the data is analysed in order to produce a resultant archaeological report. The development of the training course was driven by the market research and feedback from HE project 6205 and was a success in helping to meet the capacity requirements identified for this topic. The fact that the training course attracted participants from outside the UK implies that there is a need for such training opportunities in many more countries worldwide. Feedback from course attendees has been overwhelmingly positive and has also helped to identify

improvements that can be made to the training course. The feedback and ongoing interest within the training course does indicates that there is both the need and opportunity for it to re-run in the near future.

11 Acknowledgements

Thanks are extended to Christopher Pater, Sophie Norton and Jonathan Last from Historic England for direct involvement and support throughout the project, including invaluable discussions and feedback. At the University of Southampton and National Oceanography Centre Southampton the support of Karen McKinstry, NOCS Estate and IT group and Catering Services are all thanked for their assistance in preparing, and running, the training course and discussion meeting. Finally, special thanks are paid to all those who attended the training course over the two days and provided feedback to the course organisers. Data utilised for the practical sessions was derived from the UKHO Bathymetry DAC, INFOMAR and The Crown Estate Marine Data Exchange. Ruth Plets and Kieran Westley are also thanked for providing the bathymetry point cloud dataset from HMS Vanguard.

12 References

BMAPA and English Heritage, (2003). *Marine Aggregate Dredging and the Historic Environment: guidance note*. British Marine Aggregate Producers Association and English Heritage, London.

Dix, J. and Sturt, F. (2013) Marine Geoarchaeology and Investigative Methodologies. In Ransley, J., Sturt, F., Dix, J., Adams, J. and Blue, L. (eds.) *People and the Sea: A Maritime Archaeological Research Agenda for England*, York, GB, Council for British Archaeology, 272pp. (Research Reports, 171), 1-10.

Dunkley, M. (2008). *Protected Wreck Sites at Risk A Risk Management Handbook*. Portsmouth: English Heritage.

English Heritage (2006). *Ports: the impact of development on the maritime historic environment*. Portsmouth: English Heritage.

Firth, A. (2013) *Historic Environment Guidance for Wave and Tidal Energy*. Published by Fjordr Ltd on behalf of English Heritage.

Grant, M.J., Dix, J.K. and Sturt, F. (2014) NHPP 2D2 (Project 6205): Development and delivery of a pilot marine geotechnical training course for archaeologists: Market Intelligence Gathering Report. COARS: Southampton. Unpublished report for English Heritage.

Plets, R., Dix, J.K. and Bates, R. (2013). *Marine Geophysics Data Acquisition, Processing and Interpretation: Guidance Notes*. Swindon: English Heritage.

Trow, S. and Murphy, P. (2003). *Coastal Defence & the Historic Environment*. Swindon: English Heritage.

Appendix A: Course Timetable

Wednesday 25th January 2016

Day	Time	Description	Delivery Method	Learning outcomes
Day 1	09.00 – 09.30	Registration		
	09.30 – 1045	Session 1: Introduction: What are marine surveys, the UK legislative framework, archaeological expectations of offshore investigations *Lead: Dr Fraser Sturt and Dr Christopher Pater*	Lecture and group discussion	The purpose of marine surveys Archaeological implications and expectations of work to be undertaken
Tea				
Day 1	11.00 – 12.00	Session 2: Introduction to Marine Geophysical techniques *Lead: Dr Justin Dix*	Lecture and group discussion	Familiarity with key techniques used in marine geophysics (Bathy, SSS, Seismic and Mag)
	12.00 – 13.00	Session 3: Survey planning - Identifying project aims and determining environmental / archaeological potential at the project outset. Survey requirements for different project types *Lead: Dr Michael Grant*	Lecture and group discussion	Understand decisions process for survey design Establishing baseline potential
Lunch				
Day 1	13.30 – 15.00	Session 4: Wreck site investigations I Computer practical *Lead: Dr Justin Dix*	Tutor led computer practical looking at geophysical datasets	Identifying wreck sites Determining survey data resolution Integration of geophysical datasets
Tea				
Day 1	15.15-16.30	Session 5: Wreck site investigations II Compare Practical *Lead: Dr Justin Dix*	Tutor led computer practical looking at geophysical datasets	Use of high resolution bathymetry data Small object determination

Thursday 26th January 2016

Day	Time	Description	Delivery Method	Learning outcomes
Day 2	09.00 -10.00	Session 6: Introduction to submerged palaeolandscapes *Leads: Dr Fraser Sturt*	Lecture and group discussion	What are palaeolandscapes and can we identify them? What is their archaeological potential?
Day 2	10.00-11.30	Session 7: Palaeolandscapes I *Lead: Dr Justin Dix*	Tutor led computer practical looking at geophysical datasets	Using bathymetry for palaeolandscape identification Identifying areas of potential buried palaeolandscape features
		Tea		
Day 2	11.45-13.15	Session 8: Palaeolandscapes II *Lead: Dr Michael Grant*	Tutor led computer practical looking at geophysical datasets	Handling seismic data Identification of buried palaeolandscape features
		Lunch		
Day 2	13.45 – 15.00	Session 9: Identifying archaeological potential and mitigating impact *Lead: Dr Michael Grant*	Tutor led computer practical using GIS to bring together all datasets	Integration of geophysical datasets How to determine AEZs Plan geotechnical investigations / site interventions
		Tea		
Day 2	15.15 – 16.45	Session 10: Post survey archaeological investigations, including geotechnical and wreck investigations. *Lead: Dr Michael Grant*	Lecture and group discussion	Introduction to geotechnical techniques Further survey types including interventions
	16.45 – 17.15	Session 11: Final discussion *Lead: Dr Fraser Sturt*	Discussion	

Appendix B: Course Feedback Questions

1 Background information

The following questions will permit us to categories your responses based upon which sector you work within and how, in your role, you engage with the historic environment.

1.1 How would you describe your job role? Please select an overarching category followed by a more specific job role.

- Curatorial Roles (Historic Environment Services): Those who look after, in a management context, the historic environment
- Investigation and Research: Those who undertake invasive and non-invasive investigation for assessment recording and analysis on sites or assemblages produced from sites with archaeological interest.
- Non Heritage professional and practitioner: Those whose work bring them into regular contact with the historic environment and whose decision making may impact upon it

Please select a job role within your chosen sector:

  - Conservation Officer
  - Archaeological Curator (County Archaeologist)
  - Historic Environment Records Officer
  - Consultant providing services to local authority
  - Archaeological Contractor
  - Archaeological Specialist
  - Surveyor / Engineer
  - Researcher (University or Freelance)
  - Museum Curator
  - Developer
  - Other

2 Evaluation of the Course

Please answer the following questions in response to two day course

2.1 Please rate the course overall

- Unsatisfactory
- Fair
- Good
- Very Good
- Excellent

2.*2 Please consider your overall knowledge of the subject matter covered in the course and tick your relevant level of experience*

	No knowledge	Poor	Average	Good	Excellent
Before the course					
After the course					

2.3 Please rank the quality of the two main teaching components of the course

	Very poor	Poor	Average	Good	Excellent
Lecture-based components					
Computer-based practicals					

2.4 What were the strengths of the course?

2.5 How could the course be improved?

2.6 What did you learn during the course?

2.7 How has this course benefitted your current job role?

2.8 Do you feel this course has better equipped you to work with marine geoarchaeological (geotechnical) projects?

- Yes
- No

2.9 Would you recommend this course?

- Definitely not recommend
- Unlikely to recommend
- Recommend with reservations
- Likely to recommend
- Recommend with enthusiasm

2.10 Any other comments / suggestions?