

Her Majesty's Fire-Ship

Firebrand

Shipwreck Recording Project



Project Outline

Kevin Camidge

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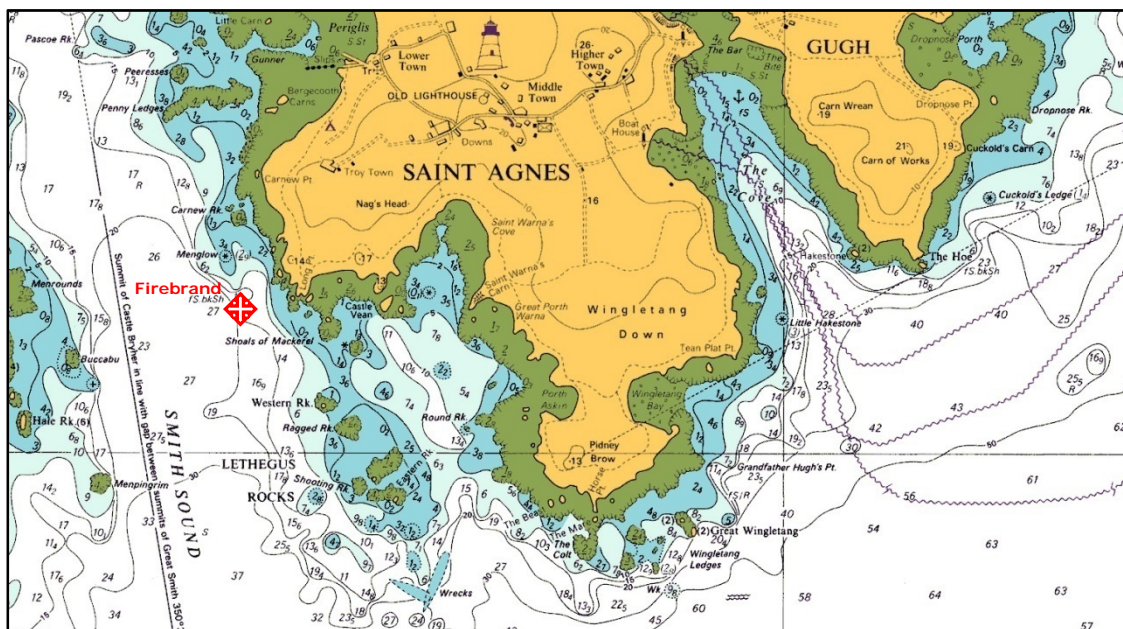
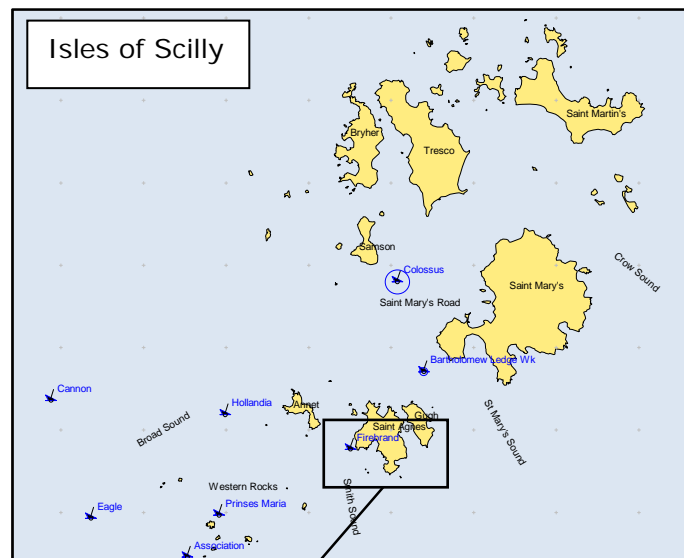
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Project Name

Firebrand shipwreck recording project

Background

The wreck of the Firebrand is located in Smith Sound, to the west of the island of St Agnes in the Isles of Scilly



The Ship

Firebrand, a purpose-built fire-ship, was launched at Limehouse on the River Thames in 1694. During her 13-year career she saw service in Newfoundland, the English Channel, the Mediterranean and the West Indies. In 1707 *Firebrand* was part of Sir Cloudesley Shovell's fleet in the Mediterranean at the siege of Toulon. As winter approached, Sir Cloudesley left a squadron blockading Toulon and set off for England with the rest of his fleet. This consisted of 21 ships including four fire-ships: *Firebrand*, *Griffin*, *Phoenix* and *Vulcan*.¹ Having miscalculated their position, the fleet ran into the Western Rocks off Scilly on the night of 22nd October 1707. Three ships, *Eagle*, *Romney* and Sir Cloudesley's flagship *Association*, were lost with only a single survivor between them. *Firebrand* also struck the rocks but managed to get off again. Leaking badly, she made for the beacon of St Agnes lighthouse. *Firebrand* foundered in Smith Sound less than a mile from the island of St Agnes. Of *Firebrand's* 45 crew members, 25 - including Captain Percy - managed to reach the safety of St Agnes. Over 1500 men perished in this incident, making it one of the worst disasters in British naval history².

Firebrand vital statistics ³	
Length	92' 3" (28.1m)
Beam	25' 5" (7.7m)
Draught	9' 7" (2.9m)
Tonnage	268
Guns	6 minions (c.3lb) ⁴ 2 falconets (c.1.5lb)
Crew	45
Built	At Limehouse by John Haydon
Ordered	13 th December 1693
Launched	31 st March 1694
Wrecked	22 nd October 1707

Site Description

The wreck lies on a gently sloping seabed at a depth of 25 to 30m. The seabed consists of regions of silty sand lying over coarse crystalline granite bedrock. The visible wreckage consists of several areas of exposed timber (oak), four large bower anchors, two smaller anchors (kedge and stream) and eight iron guns. There are also considerable amounts of concreted iron work as well as a number of exposed small artefacts. The wreckage is flanked to the east and west by low-lying granite reefs.



1 One of the *Firebrand's* four bower anchors – note the missing upper fluke.

Most of the wreckage appears to be *in situ*. A striking exception is the gun and bower anchor standing propped against each other at the northern end of the site (see cover photograph). This gun and anchor are not shown in this position on the 1981 Morris sketch – they may have been moved to this position and used as a mooring by the Morris team.

Fire-ships

Originally these were old vessels adapted as fire-ships, but by the 17th century the Royal Navy was having purpose-built fire-ships constructed. Fire-ships were specialised attack craft, but were rarely used as such; they spent their working lives as 'sloops-of-war'.⁵ The principal features which characterise a British fire-ship are:

- Gun ports hinged at the bottom edge
- Sally ports at stern for crew escape
- Fire room with special ventilation and combustibles
- Fire trunks or chimneys to spread the fire
- Grapnels to tangle the enemy vessel⁶

Fire-ships were used with success in a number of actions including those by Drake against the Spanish in 1588; Tromp, again against the Spanish, in 1639; Ruyter against the English fleet in 1672 and by Shovell against the French at La Hougue in 1692.⁷ The beginning of the 19th century saw the last fire-ships built by the British navy.

Previous Work

The wreck of *Firebrand* was located in 1981 by a team led by Roland Morris, a Penzance salvor and private shipwreck museum owner. The team recovered a number of items from the wreck including the ship's bell, a nocturnal (a navigational instrument) and a carved wooden cherub. They also made a sketch of the exposed remains.⁸ The ship's bell is owned by Mark Groves, but the whereabouts of the other items is not known.



In 2006 a survey of the seabed remains was started as a field school for Bristol University post-graduate archaeology students. The survey control point network was established and the guns and anchors were recorded and mapped.

The survey was continued in 2007 by the present team and was jointly funded by Bristol University and Sonardyne International Ltd. The work concentrated on detailed recording of the exposed wreck material and seabed topography – this was achieved for approximately 30% of the site. See site plan (appendix I & II).

2 Survey in progress using a Sonardyne Homer-Pro electronic tape measure

In 2008 the pre-disturbance survey was completed by CISMAS. This work was funded mainly by Sonardyne International Limited, with additional support from The Isles of Scilly Steamship Company, Kerrier Developments, 3H Consulting and Ambient Pressure Diving.

Research Aims and Objectives

- Record the exposed remains of the wreck of *Firebrand*.
- Establish the extent and preservation of the buried elements of the wreck.
- Determine which physical remains are peculiar to *Firebrand's* role as a fire-ship.

In addition to the aims relating to the wreck itself, we also intend to research different recording techniques and compare their efficacy. In particular, we intend to quantify the efficiency of planning frame recording at different scales. Different scales produce different levels of detail, but the larger the scale the longer the plan takes to draw. By making drawings at 1:5, 1:10 and 1:20 we hope to quantify time and quality implications for these three scales.

In 2007 the project made use of a Homer Pro acoustic measuring system loaned by Sonardyne International Ltd. We hope to be able to continue to evaluate the value of acoustic measuring and positioning systems in underwater archaeological projects.

We also intend to conduct comparative trials using drawings made from digital photomosaics. Similar work undertaken on the *Colossus* project by members of the *Firebrand* team has suggested that poor detail and accuracy can result from such surveys. The aim of this trial is to quantify the time savings, inaccuracies and detail loss when using photomosaic-generated site plans. We also intend to investigate improving photomosaic plans by diver post-plan survey.

Similarly, when recording artefacts and sediments we will conduct the work such that we can quantify the time and cost implications of recording the different data elements collected. By doing this we should at least become aware of how much various items of data are costing to collect.

The project is also being used for field trials of a generic recording schema for use in maritime archaeology. This research builds on work started during the excavation of the Dutch East Indiaman *Vliegende Hart* in 2000 and continued on other excavations including the *Mary Rose* in Portsmouth and the Roman shipwreck at Kizilburun in Turkey.

Business Case

No fire-ship wrecks have been investigated in British territorial waters. This site offers a unique opportunity to investigate this type of vessel. Although builders' plans exist for the fire-ship *Griffin*, a contemporary of *Firebrand*, these plans show very few of the specialised fittings of a fire-ship. Investigation of this site offers the chance to investigate the actual specialised weapons system of a fire-ship of this period.

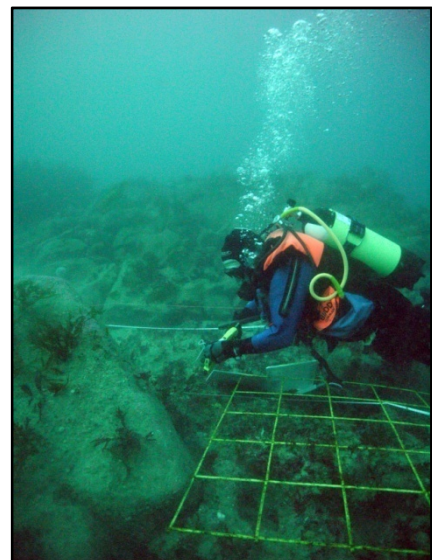
It is hoped that further benefits will accrue from the research into recording techniques and the quantification of their efficacy that will be undertaken on this project. Very little intrusive work is currently undertaken in British underwater archaeology. It is therefore important that we evaluate the recording techniques which we employ to determine the most appropriate methods to use. This work should have benefits to future projects. Similarly, the paucity of current practical work means that there are very few opportunities for students and new practitioners to learn the practical techniques of their trade. We hope to make places on the team available to suitable students and new practitioners to help address this problem.

The *Firebrand* is not a designated wreck under the Protection of Wrecks Act 1973. This is partly due to the unusual local arrangements concerning access to the *Firebrand* site. One of the reasons that this site has survived so well, especially in an area where wrecks are often exploited for their commercial value, is the unique informal guardianship of the site. Mark Groves, one of the original team which found the wreck, has managed to deter local exploitation of the wreck. Mark was very keen for our team to begin survey of the wreck in 2006 and he continues to be supportive of our work. However, he has been very keen to avoid publicity as he believes that this will only encourage irresponsible exploitation of the wreck. He has recently indicated that some relaxation of the publicity embargo may be possible – but he still believes that too much media attention before the work has been safely undertaken would be detrimental to the site's safety. Furthermore, Scilly is a close-knit island community; any rift with its members could render the project untenable.

Methods Statement

Planning Frame Survey

The planning frame survey will be undertaken using 1x1m planning frames positioned along tape baselines. The baselines will be fixed by reference to the existing control points on the site. This work will also necessitate extra control points being installed and surveyed – these will be referenced to the primary control points installed in 2006. The drawings will be made at a scale of 1:10 on waterproof drafting film. Trial squares will also be recorded at 1:5 and 1:20 to quantify the gains and losses at these scales. The site drawings will then be scanned and imported to Site Recorder (a GIS system).



Photomosaic

3 Planning frame survey 2007

The site will also be recorded photographically. The quality of underwater photographs depends on a number of factors, principally water clarity (visibility) and light levels. For this reason it is not always possible to predetermine a photography strategy for

underwater sites until the water visibility is known – on this site it can vary between 0.5m (bad) and 10m (good). That said, the method of choice given average to good visibility will be to photograph in lanes across the area – using a 24mm lens in good visibility and a 15mm lens in poor visibility. The photographs will include taut tape measures along the edges of the lanes to give position. Each photograph will overlap the adjacent photographs by 50% - thus allowing mosaicing. Drawings will be made from a small part of this photomosaic for comparison with the planning frame drawing. CISMAS has a number of digital cameras with waterproof housings suitable for this project. For any details requiring the higher quality we have a Nikonos film camera and 15mm Nikkor lens – a combination which is capable of producing high quality underwater images.

Probe Survey

A seabed probe survey will be undertaken in a number of areas of the site. This should give an indication of the depth of sediment and position of any buried timber. This will be accomplished using 2.5mm stainless steel wire probes. The results will be plotted on the existing site plan.

Test Pits

The probe survey should indicate likely areas for survival of structural timbers. A number of small test pits will be excavated in these areas. The purpose of these is to:

- Establish the nature and depth of sediment
- Establish the extent and condition of buried hull timbers
- Determine the nature and survival of ship related artefacts

The size of the test pits will depend on the depth of sediment present – but they should ideally not exceed half a metre square in plan. Initially, six test pits will be sunk in different areas of the site. The most promising area may require one or two additional test pits to confirm that area as the most suitable for further investigation. All stratigraphy and artefacts within test pits will be meticulously recorded. This will also help in determining the most effective recording strategy to be employed for the limited excavation phase. Excavation will be carried out by hand, using archaeologists' trowels and other small implements. Spoil will be removed using a water reaction dredge driven by a 3" fire-pump located at the surface. The reaction dredge will also be used to backfill the test pits once completed. All backfill will be consolidated using a covering of geotextile weighted down with sandbags.

Limited Excavation

The detailed methodology for this phase of the project can only be formulated after the test pits have been excavated and the results analysed. In general terms it is proposed that a single east-west trench, no more than 2m wide and 7m long, is excavated. The position of the trench will be informed by the results of the test pit survey. If buried structural timbers are located this should enable us to establish exactly how much of the wreck survives and exactly how the remains lie. No structural timber will be disturbed; it will be recorded and left in place. No more than 10-15% of the site will be excavated – thus ensuring that the site is available for future research.

The actual excavation method employed will be informed by the test pit excavations. Once completed, the trench will be backfilled using the spoil removed from the trench. The surface of the backfill will be consolidated using a geotextile such as Terram 4000 held in place with sandbags – this will prevent erosion of the un-consolidated backfill.

Finds

All intrusive work (test pits and limited excavation) will probably generate finds. The full strategy for dealing with this material will be developed in the project design, which will be produced at the end of the 2008 season. However, the basic technique employed will be to record the position and context of every object located. Portable finds will then be raised to the surface for detailed appraisal and recording by the conservator on the diving support vessel. They will then be conserved or reburied, according to the conservation strategy developed in the forthcoming project design. The ultimate destination of any conserved finds will need to be determined prior to any intrusive work.

Bottom Time Constraints

The depth at which the site lies imposes severe constraints on the amount of bottom time divers working on the site have. Diving is currently undertaken using air tables and a regime of no-stop diving. Decompression diving is avoided for safety reasons. Divers undertake two dives per day with a two hour surface interval. This results in a 20-25 minute bottom time for each of the two dives – a total time on the bottom of about 40 minutes per day per diver. The actual times depend on the state of the tide (water depth). If the project is to undertake excavation on the site, this limitation clearly needs to be addressed. To increase the amount of useful activity a number of options have been considered:

- Increase the size of the team
- Use NITROX breathing gas instead of air
- Use closed circuit constant ppO_2 rebreather sets

Any increase in the size of the team brings increased costs for accommodation, travel etc. It also brings increased problems of control and of finding suitably skilled individuals. The use of NITROX would be expensive – there are no NITROX facilities on the islands, and so we would have to transport large quantities of oxygen and an oxygen-clean compressor to Scilly. We would also need to find premises to operate the compressor and oxygen blending from – the NITROX blending would also be costly in terms of operator time. The rebreather option, however, would offer significant increases in no-stop bottom times. The Ambient Pressure Inspiration Vision unit would give 35-60 minute no-stop times for each dive – a significant increase over open-circuit air. The rebreather also maximises no-stop times as the partial pressure of oxygen is optimised for each dive. The low oxygen consumption of these units would mean that sufficient oxygen for a week of diving could be easily transported to the islands. The downside is the high initial cost of the unit. An Inspiration Vision unit with training, spares and essential supplies costs £7000, the minimum useful number of units would be two. If sponsors could be found to underwrite this aspect of the project, productivity could be enhanced.

Interfaces

This project will need to interface with the following ongoing projects:

- Research into the other Shovell/1707 losses
- Research into fire-ships in general
- Documentary research into *Firebrand*
- *Colossus* shipwreck stabilisation project
- Swash Channel wreck stabilisation project

Project Team

Firebrand – Core Team		
NAME	SKILL	ORGANISATION
Peter Holt	Surveyor & GIS	3H Consulting
Janet Witheridge	Draughtsman	CISMAS & LOMAG
David McBride	Skipper & Videographer	CISMAS & Tamarind
Kevin Camidge	Archaeologist	CISMAS & Darkwright Archaeology
Kimberly Monk	Archaeologist	Bristol University
Ben Rowe	Draughtsman	CISMAS
Luke Randall	Student Archaeologist	CISMAS & Bradford University
Sharon Austin	Photographer & survey assistant	CISMAS

Estimated Timescale

Firebrand – Estimated Timescale				
SEASON	TEAM	DURATION	TASKS	OUTPUTS
2009	6-8	1-2 weeks	Complete PDS if necessary Bathymetry Wide area search Recording trials Test pits	Updated site plan GIS database Progress report Updated project design
2010	8	2 weeks	Update the survey Limited excavation Recording trials Finds recording & conservation Finds disposition Write report & popular booklet	Updated site plan GIS database Finds to public display Report Popular booklet

References

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- ¹ *The Shipwreck of Sir Cloudesley Shovell on the Scilly Islands in 1707*. James H Cooke FSA - 1883
² *Poor England has lost so many men*. Ed. Richard Larn - 2006
³ *The Sailing Navy List: All the ships of the Royal Navy, built, purchased and captured*. David Lyon - 2001
⁴ *The History of English Sea Ordnance 1523-1875*. Adrian B Caruana - 1997
⁵ *The History of the Ship*. Richard Woodman – 2005.
⁶ *An Universal Dictionary of the Marine*. William Falconer - 1780
⁷ *The Command of the Ocean: A Naval History of Britain 1649-1815*. NAM Roger - 2004
⁸ *Subaqua Scene* – 1981

CISMAS project reports	www.cismas.org.uk
Site Recorder GIS	www.3Hconsulting.com
Ambient Pressure Diving	www.apdiving.com