

# Three-dimensional visualisation of HMS *Falmouth*

Bringing a First World War shipwreck back to life.

**HMS *Falmouth* was a Town Class light cruiser sunk by U-boats in August 1916. To commemorate its centenary, Fjodr Ltd, a maritime heritage consultancy company engaged in marine historic environment management, worked with Historic England to create a new digital model of the wreck.**

HMS *Falmouth* is a relatively well-known wreck site just off the coast of East Yorkshire, near Bridlington. Even though the basic details of its history are quite well known, the overall significance of the ship has been overlooked. Fjodr proposed a project to Historic England to examine the story of HMS *Falmouth* and to raise awareness amongst the wider public who visit or live at the coast but are not aware of their heritage just offshore.

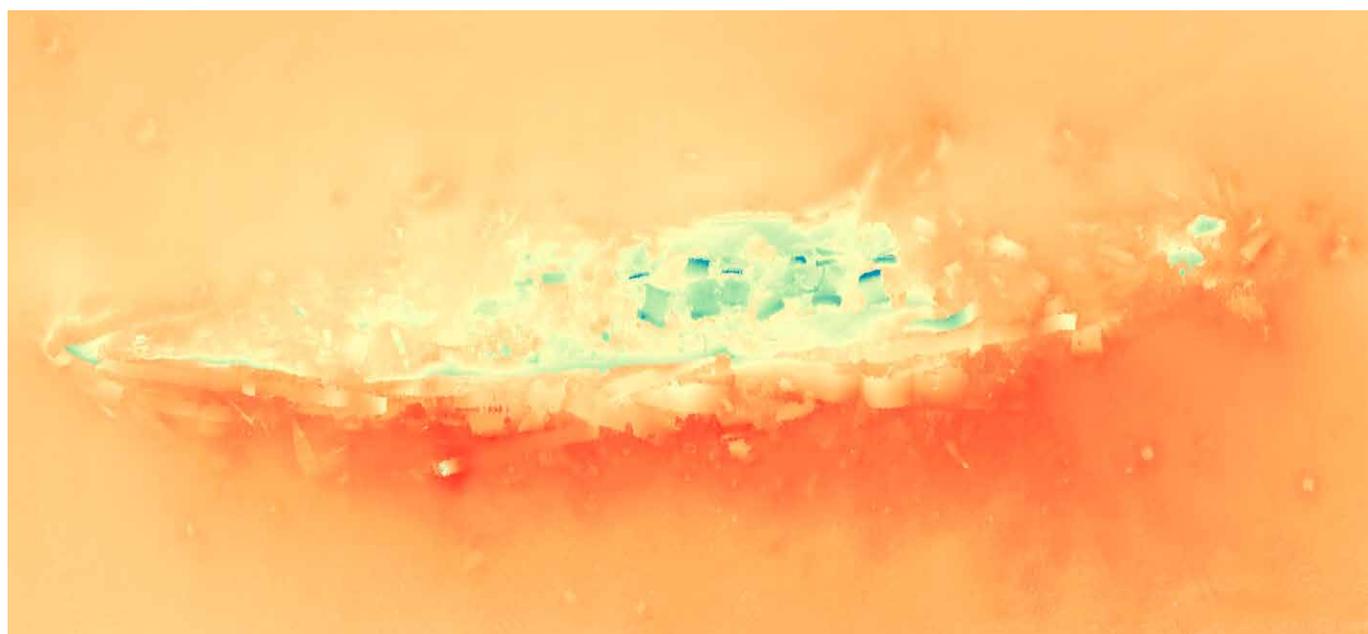
The Town Class light cruisers – of which the wreck of HMS *Falmouth* represents the only known remains – were very active in many of the campaigns and engagements of the First World War. HMS *Falmouth* itself

fought in the Battle of Heligoland Bight in August 1914 and was in the thick of the action at the Battle of Jutland in May-June 1916 as the flagship of the Third Light Cruiser Squadron. Shortly after engaging a Zeppelin, HMS *Falmouth* ran into a U-boat trap in another pivotal action on 19 August 1916 and was torpedoed.

## Gathering the evidence of the wreck

Creating a three-dimensional visualisation was not part of the original project. It arose opportunistically and with only a short timeframe available before the results of the project were due to be launched to coincide with the centenary of the loss of HMS *Falmouth*.

By good fortune, the Maritime and Coastguard Agency (MCA) was planning a high-resolution survey as part of their Civil Hydrography Programme to improve navigational safety off the Yorkshire coast. The MCA agreed to add a survey of HMS *Falmouth* to their programme. The survey was carried out by the MCA's survey contractor MMT and made available in May 2016.



High-resolution bathymetric survey of the wreck of HMS *Falmouth* by MMT. © Crown copyright



Underwater photograph showing one of ten V-shaped boilers that provided steam for HMS *Falmouth*'s turbines. © Mike Radley

The survey is excellent and has captured many details of the wreck. Although there has been a great deal of degradation, features can be identified and related to original drawings and to photographs of the remains on the seabed. Obtaining such a detailed survey is itself a major contribution to better understanding the survival and significance of the wreck and will provide a focus for further work.

A second piece of good fortune concerned the builder's model of HMS *Falmouth*. Fjordr became aware of a model of HMS *Falmouth* in the collections of the

Imperial War Museums (IWM). The model was a large-scale builder's model which is presumed to have been made by Beardmores (*Falmouth*'s builder) in 1910-11. The model became part of the Imperial War Museums' collection after the First World War.

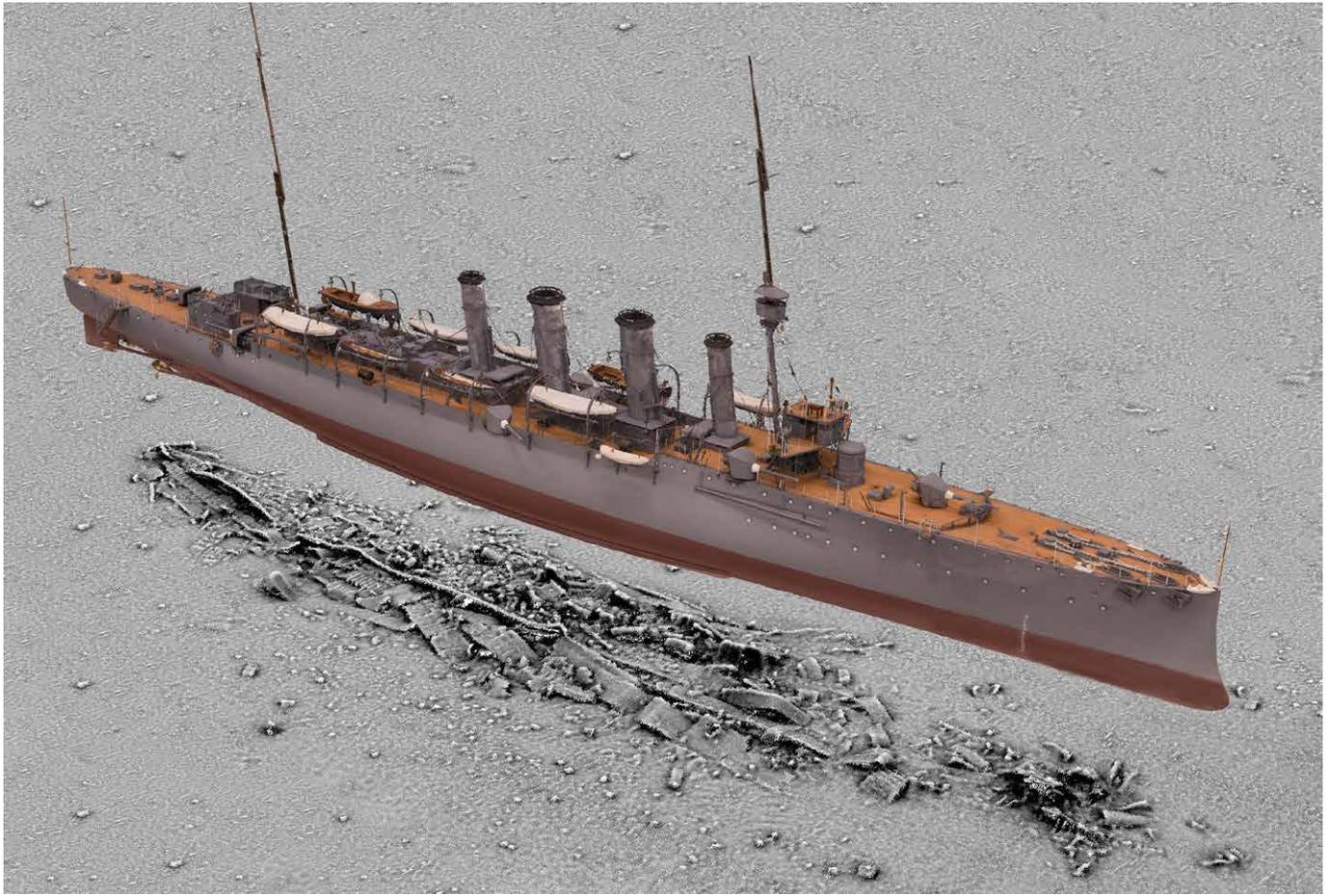
### Creating the three-dimensional visualisation

With the results of the wreck survey, and knowing about the model, the idea came about to try and combine both into a single three-dimensional visualisation that juxtaposed the wreck with the original ship and could be made available to the public. Historic England's own Geospatial Imaging team joined with Fjordr to acquire three-dimensional data from the physical model and to develop the visualisation.

The IWM kindly provided access to the model at their store at Chatham Historic Dockyard. The Historic England Geospatial Imaging team visited the Dockyard on two days in mid-June 2016 to record the model using a Leica ScanStation P40 terrestrial laser scanner and by multi-image photogrammetry using a Sony ILCE-7RM2 camera. The aim of the laser scanning was to provide control for the multi-image photogrammetry. The model was scanned from six positions with an average point spacing of 3mm. The scanner did not cope very well with the rigging but there were plenty of points on the hull that could be used for control.



The model of HMS *Falmouth* in the IWM collection at Chatham Historic Dockyard. © AJ Firth / Fjordr



Three-dimensional visualisation of HMS *Falmouth* juxtaposing wreck and builder's model. © Crown copyright

The final model was generated from 891 overlapping photographs. The photographs were taken from as many different angles as possible to achieve complete coverage of the ship. Each image is 40Mp resulting in a 120Mb TIF file, giving 104GB of image data. The photography was processed using the multi-image photogrammetry software RealityCapture, which also allows the integration of laser-scan data. Even using a high-end workstation with 128Gb RAM and specialist graphics cards, the processing and editing took several days.

Although the photogrammetry produced a better result than the laser-scan data, the model still required a lot of cleaning. Nonetheless, the still images from the visualisation were ready in time to include in the design of a [fold-out leaflet](#) distributed to museums and Tourist Information Centres. A [simplified model](#) was made available publicly using the web application Sketchfab, where the visualisation was accompanied by text with links to further information. Annotations were added to highlight features of the ship and the wreck, and to tell the story of the seven torpedoes that sank HMS *Falmouth*.

The visualisation on Sketchfab was made public to coincide with a media release – '[Jutland Wreck Brought to Life](#)' – in time for the centenary of the attack on HMS *Falmouth* on 19 August 2016. A link to the Sketchfab visualisation was also included in Historic England's own [web page](#) on HMS *Falmouth*.

Images from the visualisation featured in the extensive press coverage of HMS *Falmouth*'s centenary, both in print and online. The online versions of many newspapers embedded the Sketchfab visualisation within their pages, adding to impact and connectivity. Since being published, the visualisation on Sketchfab has received almost 19,000 views.

### Reviewing the project

Creating a three-dimensional visualisation from such a detailed physical model was very demanding, especially within the short timescale available from data acquisition to printed output. Although it has limitations, it contributed very significantly to the overall objective of raising awareness of HMS *Falmouth*,



Officers taking a break aboard HMS *Falmouth*, including Sub-lieutenant Pears (seated on stowage bin, at left). © John MacDonald

especially through the media. The visualisation will continue to serve as an intriguing conduit for people to find their way to more detailed information about HMS *Falmouth*. Hopefully, together with supporting material, it will also generate further interest locally, creating social and economic benefits through tourism and recreation, for example.

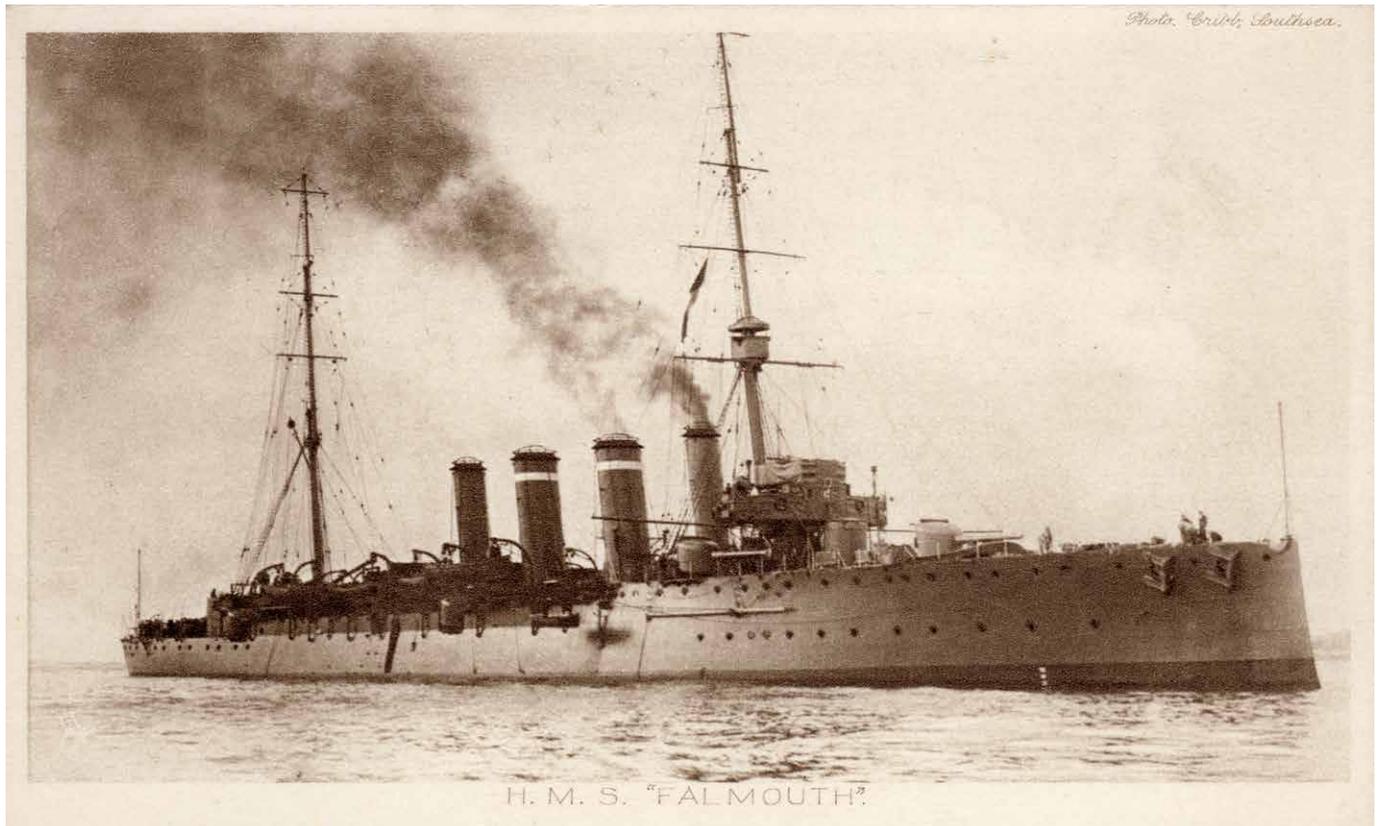
The visualisation still holds great potential for further development. Even the juxtaposition of the wreck survey and the builder's model suggests that the remains of HMS *Falmouth* are more complete and coherent than its history of clearance and salvage might suggest. The visualisation has also helped in identifying the original position of historical photographs taken aboard *Falmouth*, which it might be possible to include in future development of the visualisation. A further aspiration is to incorporate other sources of information, such as original construction drawings of the ship. Altogether, the project points the way towards far greater use of three-dimensional visualisation to 'bring to life' underwater heritage by representing and reconnecting

other seabed surveys, ship models, drawings, photographs, documents and diaries.

Gunnery Lieutenant Arnold Pears wrote poignantly of HMS *Falmouth*'s sinking as follows:

“ I have no heart to write ...  
the loss of that ship, the symbol  
to me of my home, my work, my play,  
my life, my companion in danger,  
hits me too hard ... ”

This three-dimensional juxtaposition of wreck and ship reminds us to see shipwrecks not as hidden features of the seabed, but as the important historic places in which the First World War at sea was fought.



Contemporary postcard of HMS *Falmouth*. © AJ Firth /Fjodr

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## Authors



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Antony started his career in marine archaeology as a volunteer diver in 1986. He subsequently combined fieldwork and research on historic wreck sites and submerged landscapes before working for Wessex Archaeology, where he was Head of Coastal and Marine until 2011. Antony established Fjodr Ltd. in 2012, specialising in strategic research and public engagement projects.



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