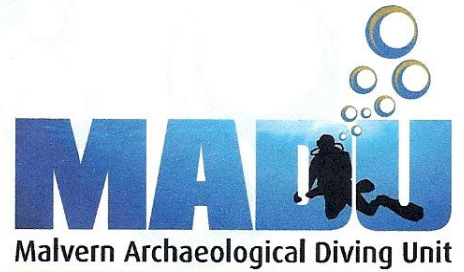




**Nautical  
Archaeology  
Society**



**Malvern Archaeological Diving Unit**

## **Survey & Recording of the Lockheed P-38F Lightning “Maid of Harlech”**



**The Remains of the  
“Maid of Harlech”  
at Low Water**

(Photographs: Ian Cundy)

# **Survey and Recording of the Lockheed P-38F Lightning**

## **“Maid of Harlech”**

Prepared by: **Malvern Archaeological Diving Unit**  
17 Hornyold Road  
Malvern  
Worcestershire  
WR14 1QQ

**March 2014**

Report Authors: **Ian Cundy, BSc, MA**  
&  
**William Turner**  
**(Malvern Archaeological Diving Unit)**

**Report Ref: MADU-P38-2014**

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## **1.0 Introduction**

The Lockheed P-38 Lightning “Maid of Harlech” came down just short of the beach at Morfa Harlech in Gwynedd, North Wales, on 27<sup>th</sup> September 1942. For much of the interim period, the aircraft has remained covered by sand, however following storms early in 2014, the aircraft has become exposed.

Despite having been on the beach for over 60 years, the “Maid of Harlech” remains in surprisingly good condition and local aviation enthusiast Mr. Matt Rimmer, in conjunction with the International Group for Historic Aircraft Recovery (TIGHAR) are hoping that the aircraft can be recovered, conserved and eventually displayed.

Before this can take place however, a pre-disturbance survey was considered necessary, and the Malvern Archaeological Diving Unit (MADU) were invited by Mr. Rimmer to provide the necessary survey of the site. The intentions were to record the exact location, orientation and condition of the remains thereby providing a historical record of the aircraft as is at this time, together with further information that may be of assistance should recovery take place at a future date.

## **2.0 Table of Contents**

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### 3.0 Historical Record

The story of the "Maid of Harlech" has been well documented over the years, and for interest the following transcript is taken from the Coflein web site at:

[http://map.coflein.gov.uk/index.php?action=do\\_details&cache\\_name=cG5tcnNuYW1lLG1haWQgb2YgaGFybGVjaF9zZWZyY2h0eXBILGFkdmFuY2VkX29yYQ==&numlink=240201#tabs-4](http://map.coflein.gov.uk/index.php?action=do_details&cache_name=cG5tcnNuYW1lLG1haWQgb2YgaGFybGVjaF9zZWZyY2h0eXBILGFkdmFuY2VkX29yYQ==&numlink=240201#tabs-4)

#### **Event and Historical Information:**

*Originally conceived to meet a requirement for a high-altitude fighter and designed by the Lockheed design team under H L Hibbard in 1937. The first prototype, Model 22, was accepted by USAAC on 23 June 1937 and a single prototype was ordered. The first prototype was flown by Lt B S Kelsey on 27 January 1939, and by August 1941, the first fully combat standard machine, P-38D, had been introduced. The RAF placed an order for 667 P-38 in March 1940, but the order was cancelled after the aircraft could not be supplied with turbo superchargers. However, production totalled 10,037 aircraft with seven major variants. The planes were powered by a pair of Allison V-1710 engines.*

*The first P-38s to reach Britain were those of the of the 1st and 14th fighter groups in the summer of 1942. The 14th Group flew the first operations in late July 1942. Some shortcomings were recognised in encounters with the Luftwaffe's single engined fighters, but reconnaissance models were particular successful and mapped large areas of occupied Europe. Only 32 complete airframes are believed to survive, with 10 aircraft still flying.*

*The P-38 Lightning discovered on the sands near Harlech was brought to Britain in the summer of 1942. It had been delivered new on 26 June 1942 and been flown for 105:05 hours, including combat missions over the Dutch and Belgian coasts. On 27 September 1942, Second Lt. Robert F. Elliott, 24, of Rich Square, North Carolina, was on a gunnery practice mission. He took off from Llanbedr at 14:00. The aircraft took off from Llanbedr at 14:00 and climbed to 6000ft. Elliot flew the range in the usual manner with another aircraft firing at the target he was towing. After 55 minutes, the left engine lost power. Believing the problem to be the propeller, he tried to correct it with manual controls. Elliot then decided to go into land. With the aircraft trimmed for single engine flight, Elliot flew over the airfield at 1000ft. He dropped the target, then circled again and began a landing approach. At around 800ft and 2 miles from the airfield, the right engine stopped. Elliot then turned to glide down onto the beach. Undershooting, he landed in 2ft of water. His statement to investigators notes that he later checked the tank, found that they were still set on reserve and realized his error (he had been flying for 1 hour and 5 minutes). The investigators concluded that it was carelessness on the part of the pilot - he should have switched to the main tank about 15 minutes before take-off and immediately prior to landing switched back to the reserve tanks. A memo from the Office of the Engineer*

*Officer dated 2 October 1942 noted that the damage by crash landing and salt water was extensive and that it would be necessary to salvage the entire airplane. It appears to have been abandoned after the guns were removed.*

*A shift in a channel through the sands revealed the plane to a family of beach walkers on 31 July 2007, but the aircraft had been recovered by the shifting sands by October of the same year.*

## 4.0 Methodology

Over the weekend of 29<sup>th</sup> and 30<sup>th</sup> March 2014 the following people assisted with the pre-disturbance survey and recording of the “Maid of Harlech”:

Ian Cundy	MADU / NAS
William Turner	MADU / NAS
Ian Featherstone	Manchester Diving Group
Peter May	Manchester Diving Group / NAS
Melanie Taylor	Manchester Diving Group / NAS

Also in attendance were:

Matt Rimmer	Project Director
Ifan Eryl Jones	Snowdonia National Park Authority (Ifan is the local area warden, and he very kindly ferried us and our kit on the Saturday over the dunes and along the beach to and from the site)

On the Sunday aerial photography and videography was also carried out using a pair of small Unmanned Aerial Systems (sUAS) by:

John Mearman	Skyonix
Joseph Mearman	Skyonix

### 4.1 Positioning Survey

An initial Positioning Survey was carried out with the total station set up on the beach adjacent to the site at around half tide. The total station’s location was determined using two separate GPS and by taking reference angles from visible known landmarks on the horizon using both the total station and as a double check using a hand held sextant. The results were then plotted on Admiralty Chart SC 1971.

See Drawing No. MADU-P38-001

### 4.2 Co-ordinate Survey

Having positioned the Total Station, a Co-ordinate Survey was carried out using the total station and pole mounted prism. The extremities of the aircraft were recorded together with two Invasion Posts that remain standing adjacent to the aircraft. The centre of both wing tips and the cockpit nose cone were also recorded using a GPS as a double check and to assist with the aircrafts orientation (see Diagram 1 below). The results of the Co-ordinate Survey were then plotted on OS Map 124.

See Drawing No. MADU-P38-002

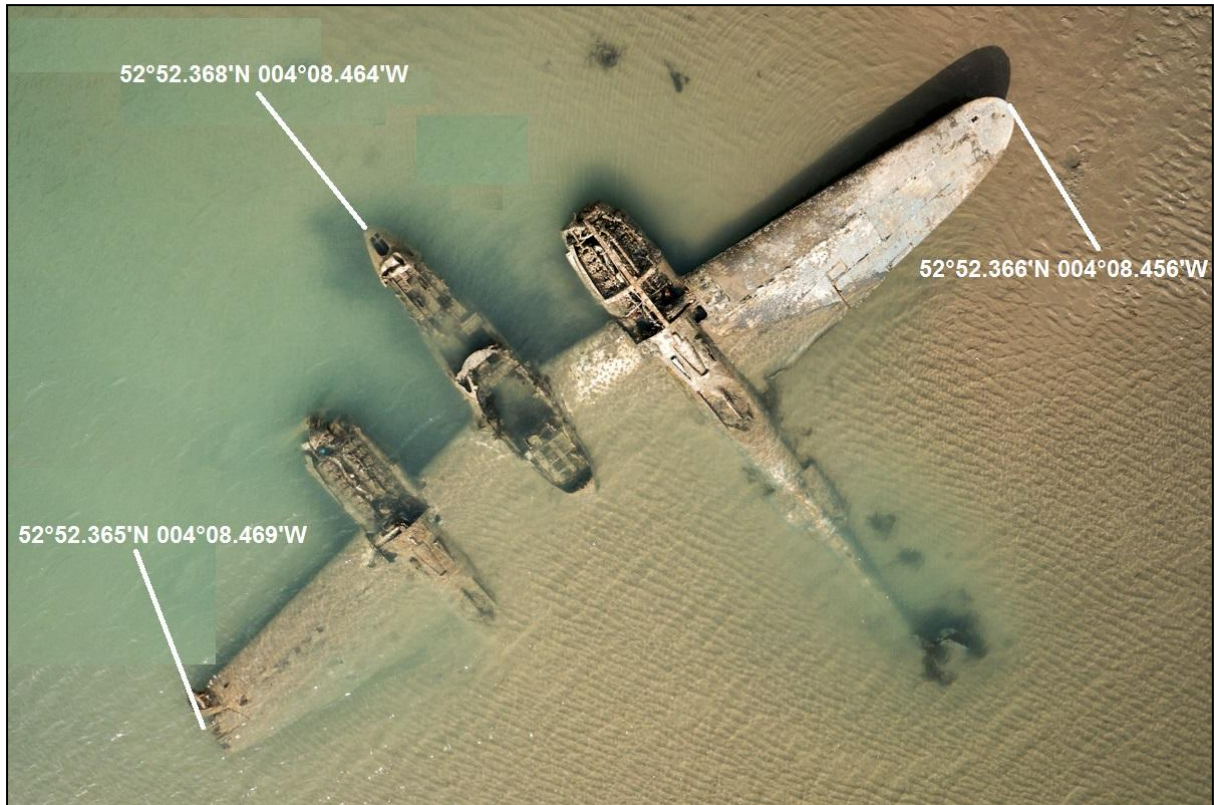


Diagram 1. Co-ordinates of the “Maid of Harlech” Nose Cone & Wing Tips. (Photograph: Skyonix)

### 4.3 Offset Survey

A tape base line was laid across the aircraft from the tip of the starboard wing to the centre of the broken end of the port wing. Offset measurements were then taken both to the north and south of the baseline to the same positions that had previously been surveyed using the total station. The offset points were then overlaid onto a scaled plan drawing of a P-38 aircraft.

See Drawing No. MADU-P38-003

### 4.4 Photographic Survey

During the course of the weekend photographs and videos were taken of the aircraft, the site, and the work being carried out. A selection of the photographs taken by Ian and Mel have been assembled and related to a plan drawing of a P-38 aircraft, see:

Drawing No. MADU-P38-004

Drawing No. MADU-P38-005



## 5.0 Results

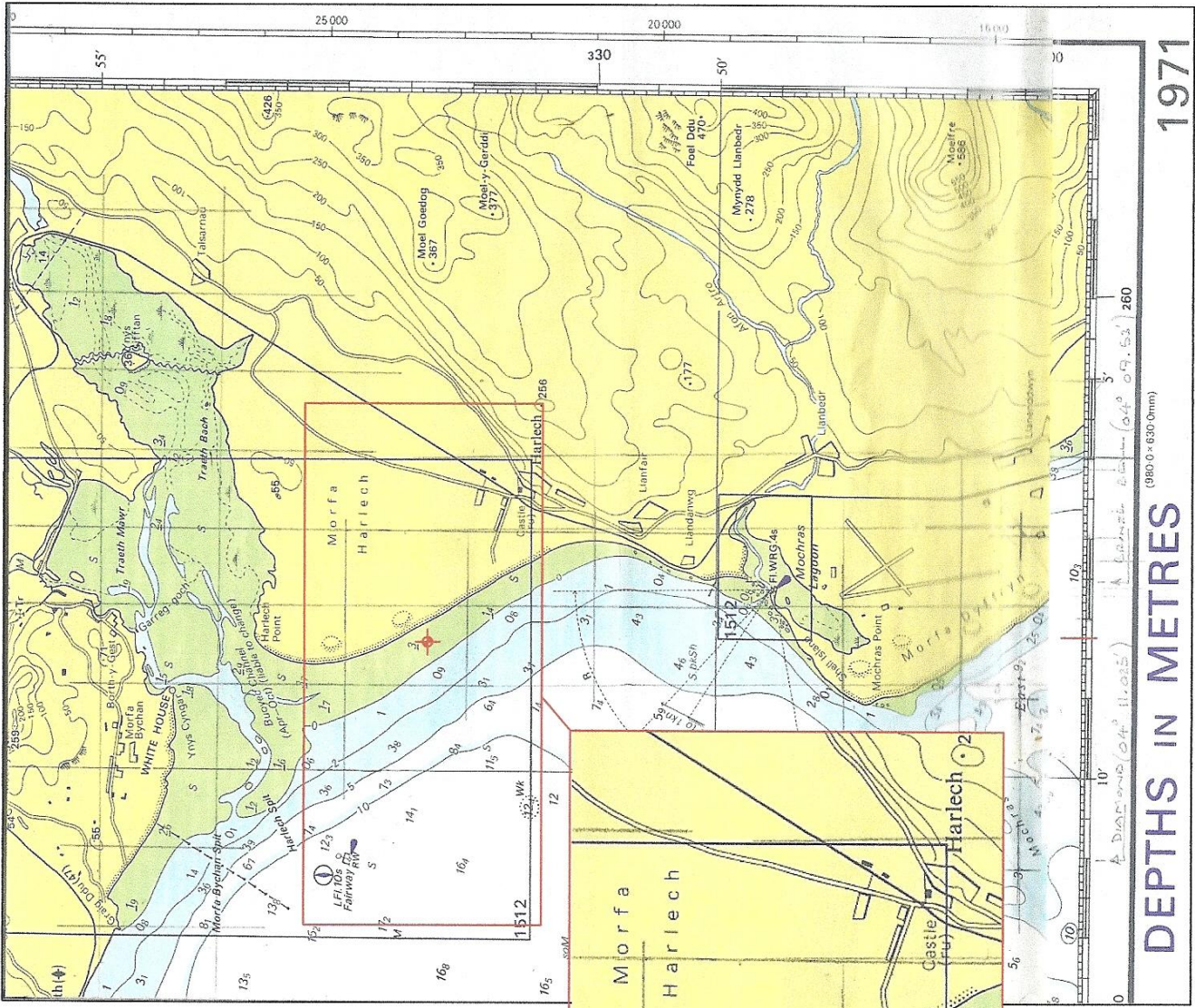
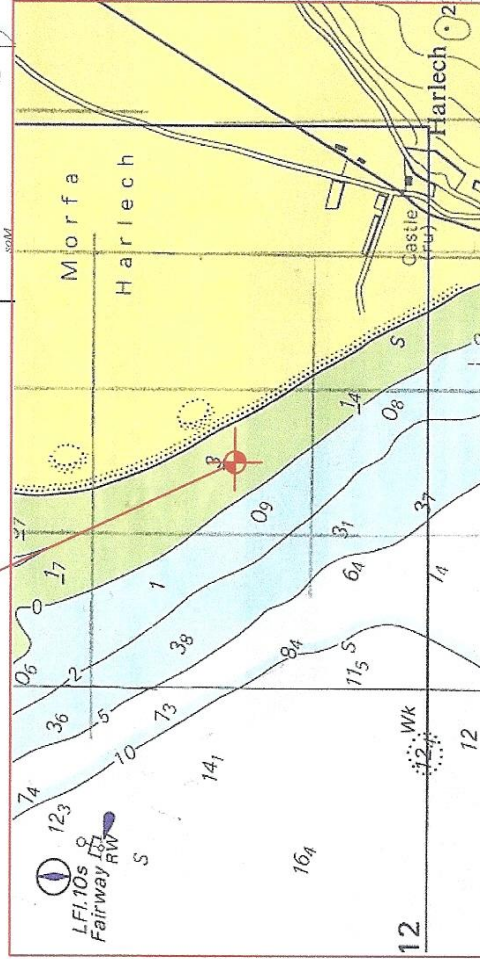
The results from the weekend's survey and recording work are diagrammatically & pictorially displayed on the following pages as follows:

5.1	Positioning Survey (overlaid on Admiralty Chart SC 1971)	Page 10
5.2	Co-ordinate Survey (overlaid on OS Map 124)	Page 11
5.3	Offset Survey (overlaid on a scaled plan drawing of a P-38)	Page 12
5.4	Photographic Survey	
5.4.1	Ian Cundy (selection of photographs)	Page 13
5.4.2	Melanie Taylor (selection of photographs)	Page 14



P38 "Maid of Harlech" - Survey 29th & 30th March 2014

Co-ordinates	Latitude (north)	Longitude (west)	OS	Eastings	Northings
Total Station	52 deg 52.4175'	04 deg 08.430'	SH 56033 32830	256033	332830
Starboard Wing Tip	52 deg 52.366'	04 deg 08.455'	SH 56001 32735	256001	332735
Cockpit Nose Tip	52 deg 52.368'	04 deg 08.464'	SH 55992 32740	255992	332740
Port Wing Tip	52 deg 52.365'	04 deg 08.469'	SH 55987 32734	255987	332734



1971

DEPTHS IN METRES

Title	P38 "Maid of Harlech" - Positioning Survey
Date	29th - 30th March 2014
Drawn	Ian Cundy
Scale	Various
Drq No.	MADU - P38 - 001

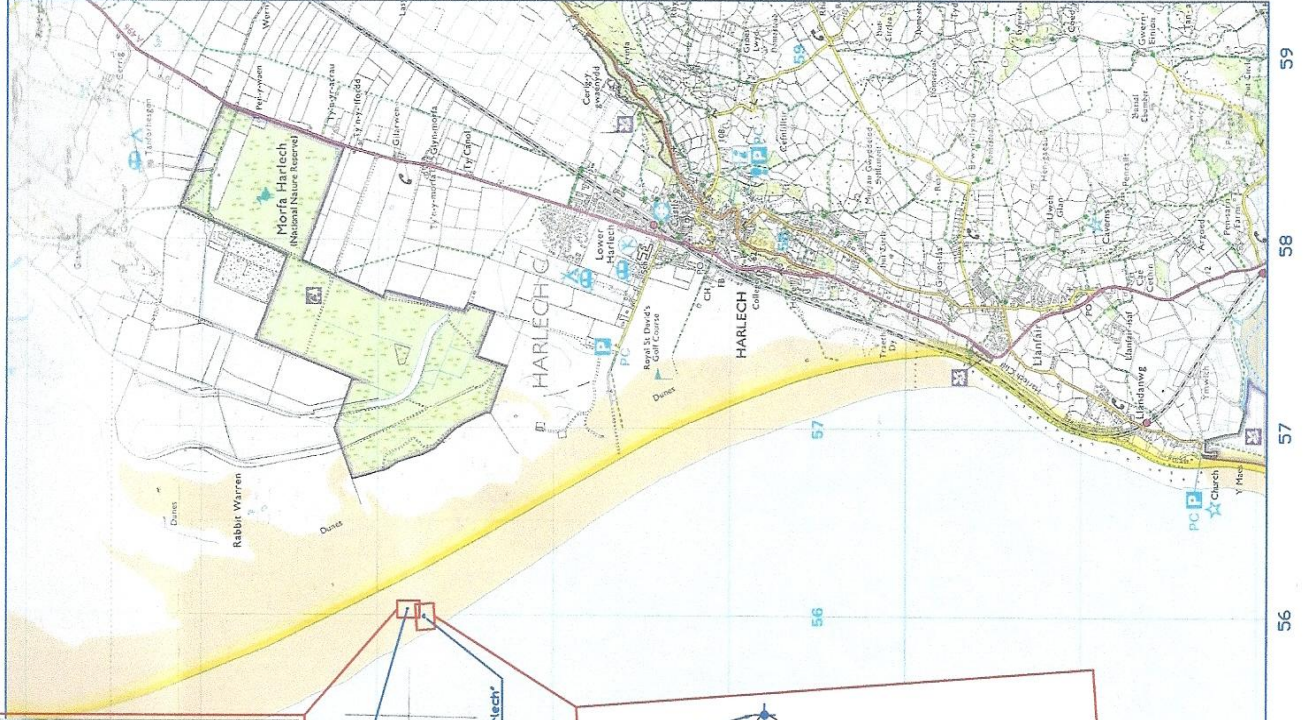
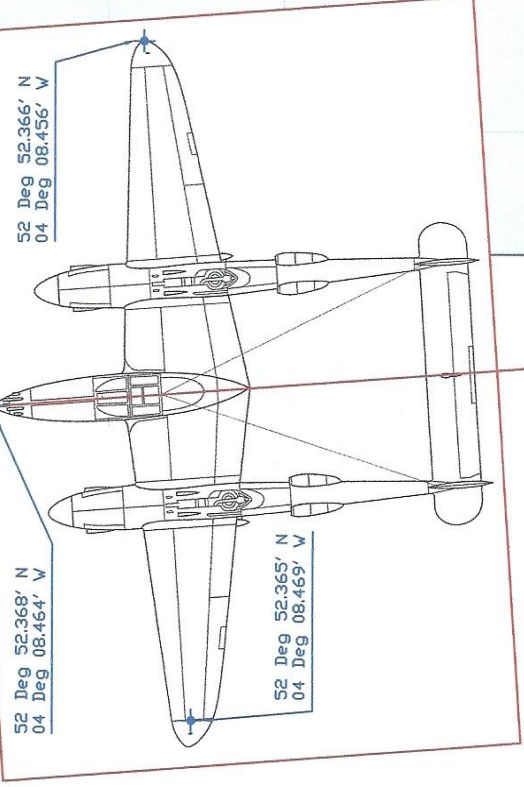
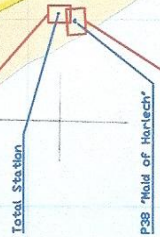


**P38 "Maid of Harlech" - Survey 29th & 30th March 2014**

Co-ordinates	Latitude (north)	Longitude (west)	OS	Eastings	Northings
Total Station	52 deg 52.4175'	04 deg 08.430'	SH 56033 32830	256033	332830
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Cockpit Nose Tip	52 deg 52.368'	04 deg 08.464'	SH 55992 32740	255992	332740
Port Wing Tip	52 deg 52.365'	04 deg 08.469'	SH 55987 32734	255987	332734



3.9592\*



Title	P38 "Maid of Harlech" - Coordinate Survey
Date	29th - 30th March 2014
Drawn	Ian Cundy
Scale	Various
Drw No.	MADU - P38 - 002

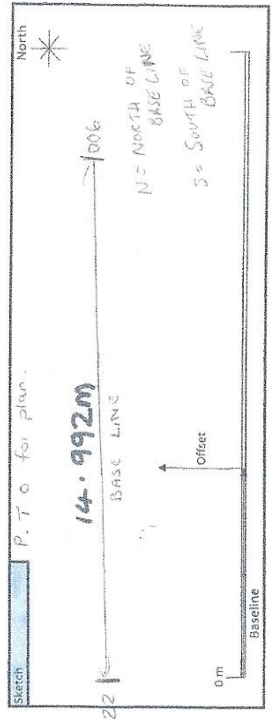


Offset Surveying Recording Form

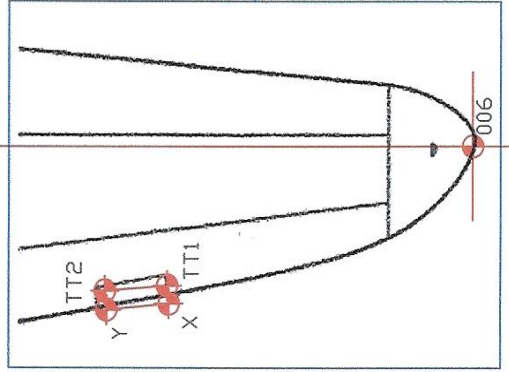
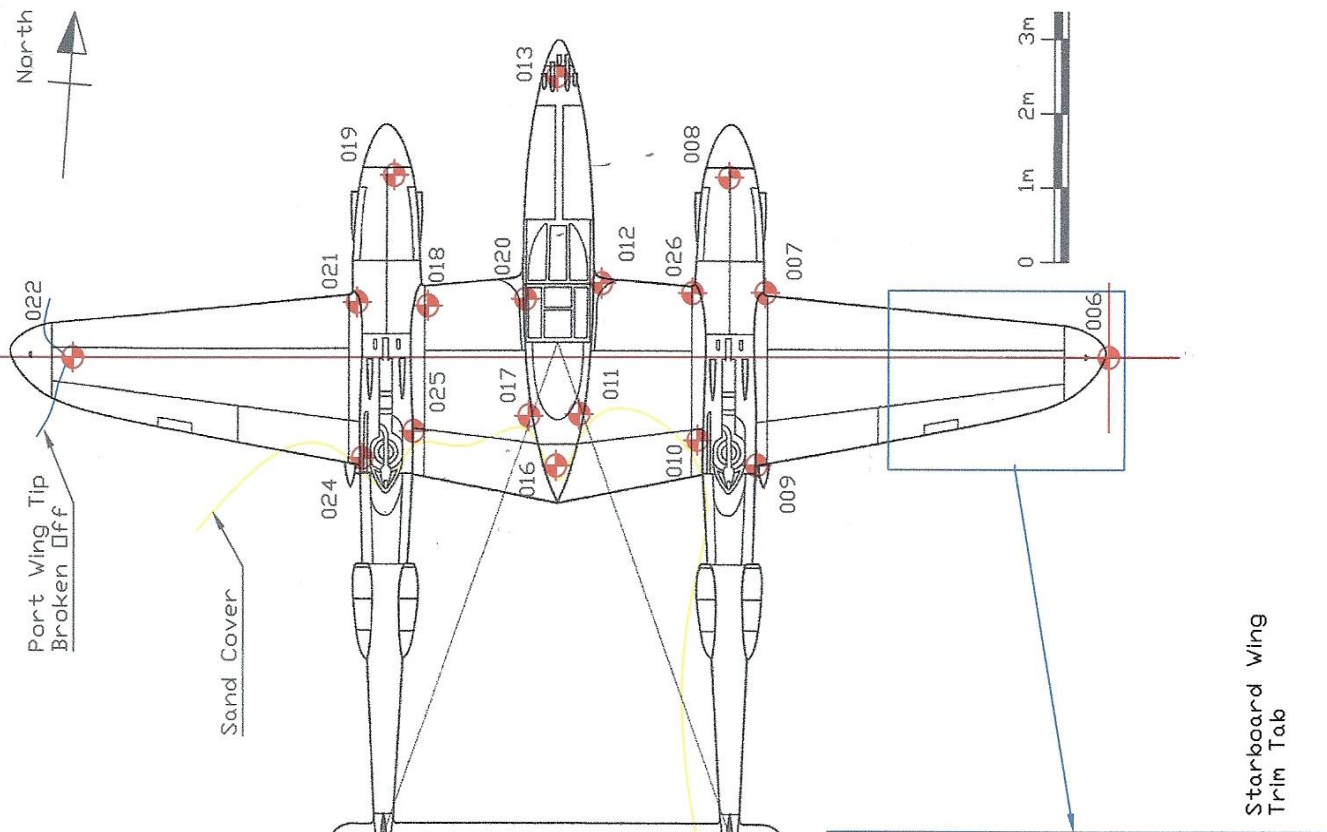
**PERSONAL DETAILS:**  
 Surveyors Names: *Melanie Taylor & Ian Featherstone*  
 Contact Details: *M.T. 01253 613 900 / I.F. 022207 952557*  
 Tel. No.:  
 E-mail: *m.taylor@madu.org.uk*

**SITE DETAILS:**  
 Site Name: *P38 Maid of Harlech*  
 Location: *Map Ref. OS*  
 Date: *30th March 2014*

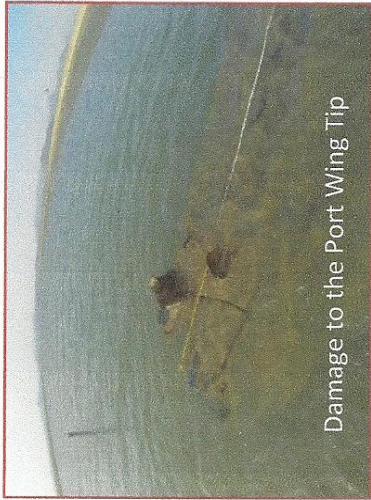
Detail Point Ref.	Baseline m	Offset m	Detail Point Ref.	Baseline m	Offset m
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008N	5.494	1.414			
009S	5.090	1.450			
010S	5.948	1.110			
011S	7.664	0.760			
012N	7.840	0.976			
013N	7.990	3.778			
017S	8.392	0.782			
013N	9.854	0.760			
019N	10.344	12.452			
020N	8.440	0.788			
021N	10.880	0.746			
025S	10.800	1.348			
026S	10.060	0.964			
007S	12.190	0.990			
006S	12.532	1.024			



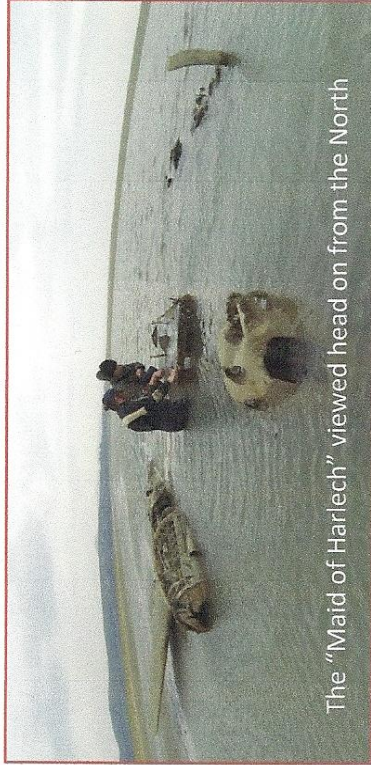
**Title** P38 'Maid of Harlech' - Offset Survey  
**Date** 30th March 2014  
**Surveyors** Melanie Taylor & Ian Featherstone  
**Drawn** Ian Cundy  
**Scale** As Shown  
**Drwg No.** MADU - P38 - 003



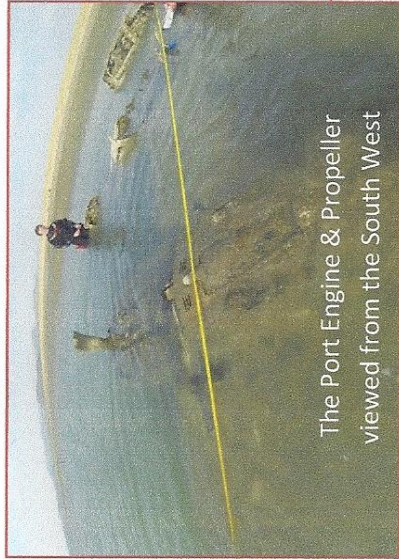




Damage to the Port Wing Tip



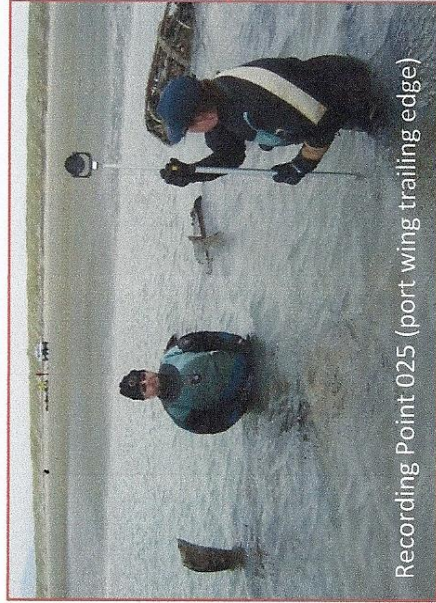
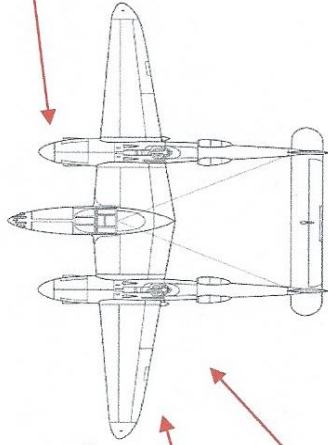
The "Maid of Harlech" viewed head on from the North



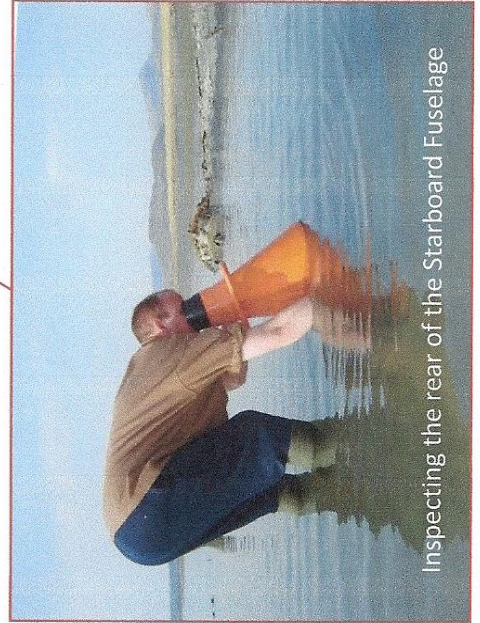
The Port Engine & Propeller viewed from the South West



The Starboard Engine viewed from the North West



Recording Point 025 (port wing trailing edge)



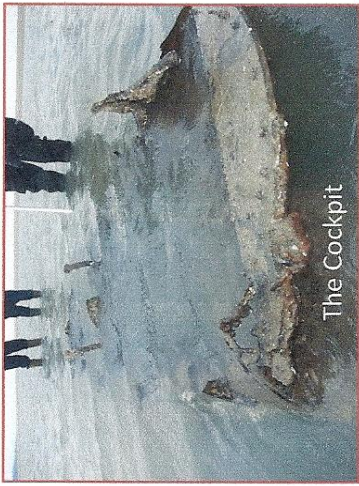
Inspecting the rear of the Starboard Fuselage



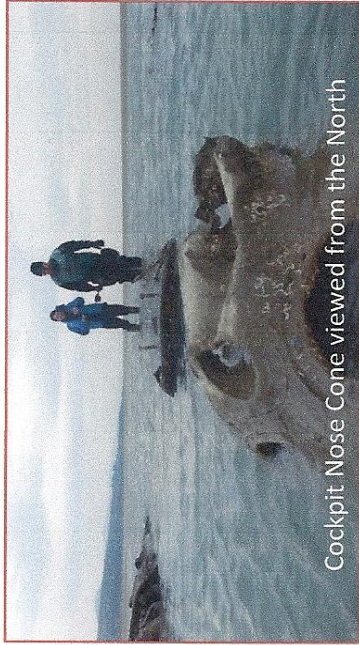
Recording Point 006 (tip of starboard wing)

Title	P38 "Maid of Harlech" – Photographic Survey
Date	29 <sup>th</sup> – 30 <sup>th</sup> March 2014
Photographer	Ian Cundy
Drg No.	MADU – P38 – 004

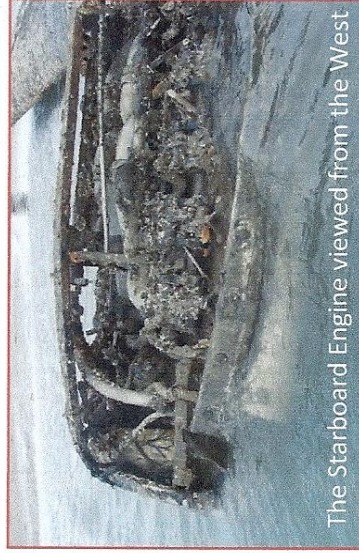




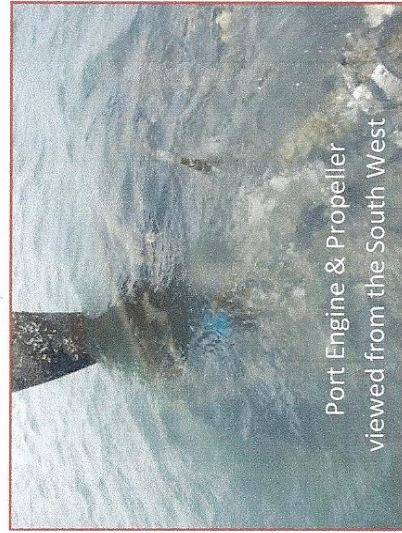
The Cockpit



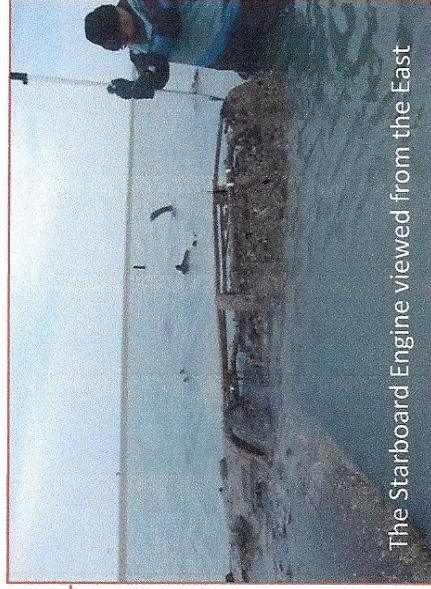
Cockpit Nose Cone viewed from the North



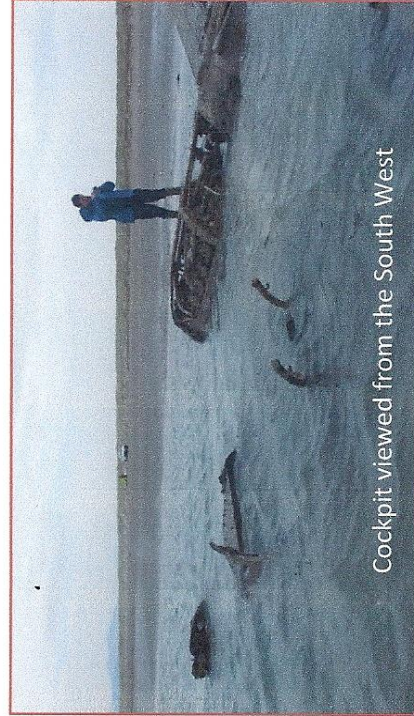
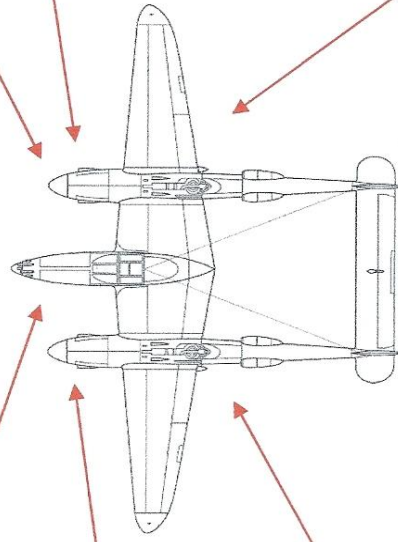
The Starboard Engine viewed from the West



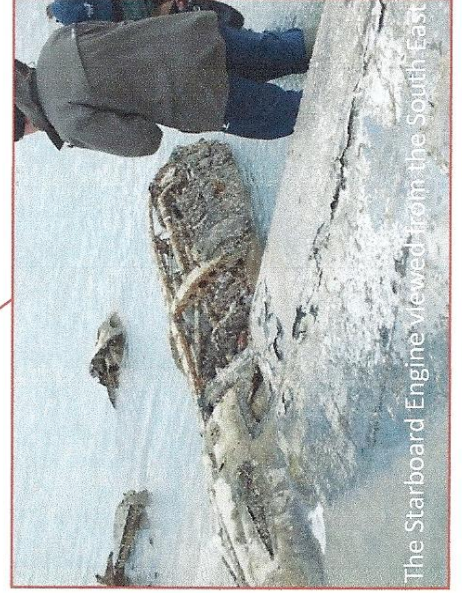
Port Engine & Propeller  
viewed from the South West



The Starboard Engine viewed from the East



Cockpit viewed from the South West



The Starboard Engine viewed from the South East

Title	P38 "Maid of Harlech" – Photographic Survey
Date	29 <sup>th</sup> – 30 <sup>th</sup> March 2014
Photographer	Melanie Taylor
Drg No.	MADU – P38 - 005



## 6.0 Conclusions & Recommendations

The current survey was carried out in March which is early in the season, and as anticipated, very little marine growth was observed on the wreck. By comparison when the aircraft was previously inspected by TIGHAR in October 2007 (i.e. towards the end of the year), considerable marine growth was observed (Claus et al. 2007, pages. 4, 16 & 21).

During the current survey, the fuel filler caps on the inner wings were observed to still be in place, however small amounts of fuel were thought to possibly be leaking out of the caps into the water. From the Coflein Historical Report (re-printed above), there is the strong possibility that both the main fuel tanks may still contain a considerable amount of fuel. As the aircraft's location is on a Site of Special Scientific Interest (SSSI), it is imperative that the condition of the fuel tanks be checked at the earliest opportunity, and for any fuel, oil and other lubricants, together with any other potentially dangerous contaminants, armaments, etc., be removed from the aircraft before any further work is carried out on the site. The potential for any environmental catastrophe must obviously be avoided at all costs. Also in the event that the aircraft was recovered it is likely to become a very high profile media event, with all the associated comment and scrutiny that will inevitably be attached to occasion.

We have been advised that as recent as January 2014, no physical signs of the aircraft were visible, the wreck being completely covered by sand. As can be seen from photographs included in this report, by March 2014 a sufficient amount of the aircraft had become exposed to the extent that recovery could certainly be considered without extensive excavation. In our opinion it is therefore imperative that if recovery is to become a reality, it should be considered as an urgent matter before the structure again becomes buried under the sand.

In addition, in its present uncovered condition, the wreck is very vulnerable both to the ravages of the environment, being exposed to the elements on the beach at low water and submerged twice a day at high tide, and to damage caused by visitors on the beach. Successful recovery of the aircraft will inevitably diminish with time, and if salvage is to take place, it should be considered at the earliest possible opportunity. In the meantime, ongoing monitoring and inspection of the site is imperative. While Mr. Rimmer is currently carrying out this brief on his own initiative, Matt cannot be expected to carry this out indefinitely, single handed, and on a voluntary basis.

## 7.0 References

### 7.1 Publications

Clauss, J, Fuller, C, Gillespie, R, McKenna. A & Quigg GF. 2007, *An Archaeological Survey and Preliminary Assessment for Recovery of a P-38 WWII Airplane Harlech, Gwynedd County, Wales, United Kingdom*, The International Group for Historic Aircraft Recovery (TIGHAR).

Eden, P (ed), 2004, *The Encyclopaedia of Aircraft of WWII*.

Grant, RG, 2002, *Flight: 100 Years of Aviation*, Dorling Kindersley Ltd.,

RCAHMW Digital Collections, *Report of Aircraft Accident 43-09-27-508*, US Army Air Force

US Army Air Force, 1942, *Handbook of Erection and Maintenance Instructions: P-38F-5 Airplane*.

US Army Air Force, 1944, *Airplane Parts Catalog: Models P38F & P-38G*.

US Army Air Force, 1942, *Pilot's Flight Operating Instructions for Army Models P-38 Series, F-4 and F-5 Series*.

### 7.2 Web Sites

Coflein

[http://map.coflein.gov.uk/index.php?action=do\\_details&cache\\_name=cG5tcnNuYW1lLG1haWQgb2YgaGFybGVjaF9zZWYy2h0eXBILGFkdmdFuY2VkX29yYQ==&numlink=240201#tabs-4](http://map.coflein.gov.uk/index.php?action=do_details&cache_name=cG5tcnNuYW1lLG1haWQgb2YgaGFybGVjaF9zZWYy2h0eXBILGFkdmdFuY2VkX29yYQ==&numlink=240201#tabs-4)

Skyonix

<http://vimeo.com/skyonix/review/90707545/139eb6d479>

TIGHAR

<http://tighar.org/Projects/P38/welshlightning.htm>

&

<https://www.facebook.com/media/set/?set=a.352562140657.162459.224536440657&type=3>

Urban Ghosts

<http://www.urbanghostsmedia.com/2011/02/crashed-p38-lightning-maid-harlech/>

YouTube

<http://www.youtube.com/watch?v=Y3nddCJbcdI>