Wessex Archaeology

Aircraft Crash Sites at Sea
A Scoping Study

Archaeological Desk-based Assessment

Ref: 66641.02

February 2008

AIRCRAFT CRASH SITES AT SEA:
A SCOPING STUDY

ARCHAEOLOGICAL DESK-BASED ASSESSMENT: FINAL REPORT

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Summary

Wessex Archaeology have been funded by English Heritage through the Aggregates Levy Sustainability Fund to undertake a scoping study to identify current gaps in data and understanding relating to aircraft crash sites at sea. The study arises partly out of the discovery of aircraft parts and associated human remains as a result of marine aggregate dredging.

The objectives of the Scoping Study are as follows:

- to review existing literature relating to the archaeology of aircraft crash sites at sea, existing guidance, and the legislative context;
- to clarify the range and archaeological potential of aircraft crash sites, by presenting examples of aircraft crash sites, which will include a range of site conditions and mechanisms affecting site survival, their management and investigation;
- to establish the relationship, in terms of numbers and composition, between the National Monuments Record record of crash sites/casualties at sea, and the possible extent of the overall resource, the surviving resource of aircraft in preservation, and aviation history overall;
- to identify and describe possible additional sources of data, situated both in the UK and abroad, relating to aircraft crash sites;
- to gauge, by active engagement, public interest and values in respect of aircraft crash sites at sea;
- to summarise the role and interests of existing authorities and stakeholders in aircraft crash sites;
- to contribute to interim guidance for the marine aggregate industry on the reporting, management and investigation of aircraft crash sites at sea; to be forthcoming as part of the ALSF dissemination project;
- to make the results of the project available to specialist and general audiences, both in England and globally.

Thousands of aircraft are likely to have been lost in UK territorial and near-territorial waters during the 20th century. A high proportion of these losses are likely to be combat losses or accidental losses of military aircraft that occurred during WWII. The potential resource is therefore very large.

The number of known aircraft crash sites on the seabed as recorded by the National Monuments Record and local Sites and Monuments Records and Historic Environment Records is relatively small. The known resource is therefore relatively small. Notwithstanding issues concerning survival, the potential therefore exists for the presence of a very large number of currently unknown crash sites on the seabed and, to some extent, in the inter-tidal zone. Recent discoveries of previously unknown aircraft crash sites in licenced marine aggregate dredging areas suggests that there is a need for urgent national and local record enhancement in areas of seabed likely to be impacted by human activities.

The discrepancy between the known resource and the potential resource can be addressed by research of both primary and secondary material. However, there is a huge amount of this material and it is not complete. There is also likely to be a lack of good quality data concerning the positions of losses. Enhancing existing databases is likely to be very time consuming and therefore can most effectively be achieved by harnessing the information and expertise of existing aviation researchers, both in the UK and abroad. Much of the work undertaken by these researchers is not geographically orientated and may require further work in this respect. In addition much of it is currently unpublished and therefore vulnerable to loss.

Seabed and inter-tidal environments, particularly those that result in burial or other favourable preservation environments, currently offer the potential for much more intact survival than most terrestrial sites. This can be seen in the case studies examined as part of this project. However, locating well preserved sites is problematic and currently largely a matter of chance.

Management and research considerations are dominated by the application of the Protection of Military Remains Act 1986 to most of the sites that constitute the resource. They are also complicated by the possible presence of human remains from what are, archaeologically speaking, recent casualties and by various international interests.

English Heritage has devised a method of assessing the importance of aircraft crash sites through research conducted for the Monuments Protection Programme. The approach suggested appears to be simple and effective, although lists of ‘extinct’ and otherwise important aircraft need updating. Through the same research a basic research agenda that could be applied to aircraft crash sites on the seabed has been suggested. This requires more detail and imput from all stakeholders to ensure that it becomes a truly workable strategy. An agreed means of risk assessing known aircraft crash sites is not currently available.

The question of preservation *in situ* needs further consideration and consultation. A preservation *in situ* policy has been advanced by English Heritage in relation to archaeological sites on the seabed in the last few years. However current English Heritage guidelines for managing aircraft crash sites do not envisage the preservation *in situ* of most aircraft remains and control of the licencing process is not directly in the hands of English Heritage.

Aircraft crash sites appear to be of widespread interest to the general public and to special interest groups. Numerous potential stakeholders have been identified, some of whom, such as aircraft recovery groups, may not have research agendas that sit entirely comfortably with current heritage management thinking. This needs to be addressed further.

The following key recommendations are made:

- Aircraft crash sites at sea should be given greater attention and priority in both research and management agendas on both national and regional levels.
- The existing national and local monument records require enhancement in respect of aircraft crash sites at sea order to make them more useful. Priority should be given to incorporating existing relevant unpublished research over undertaking original research.
- A more detailed and specific national research agenda for aviation archaeology should be established. The approach taken should be flexible and should address and incorporate the potential interests of all stakeholders. The agenda set out in *Modern Military Matters*, together with an updated list of 'extinct' aircraft would be a suitable starting point.
- Existing guidance for marine industries does not fully address the specific problems of aircraft crash sites. Additional archaeological and heritage management guidance specific to aircraft crash sites should therefore be prepared for all sectors of marine industry that may have an impact upon aircraft crash sites.
- Joint Casualty & Compassionate Centre and the British Aviation Archaeology Council should be encouraged to continue to promote and improve basic standards of archaeological recording and reporting amongst Protection of Military Remains Act licence holders.
- A method of risk assessing aircraft crash sites is required. The approach adopted in relation to sites designated under the Protection of Wrecks Act (1973) is recommended (EH 2007).
- Research should be undertaken in a number of areas in order to inform the above guidance and to assist in the management of aircraft crash sites.

Draft interim guidance for the marine aggregate industry on dealing with aircraft crash sites at sea has been produced. This builds on the existing industry protocol for reporting finds of archaeological interest and is included as an Appendix in the report.

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- Air Historical Branch
- Air Accident Investigation Branch
- Alan Turner
- Albert F. Simpson Historical Research Centre, USA
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- Bentwaters Aviation Society
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- Brian Boulton
- Bristol Industrial Museum
- British Aviation Archaeology Council
- British Aviation Preservation Council
- British Marine Aggregate Producers Association
- Carpetbagger Aviation Museum
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- Commonwealth War Graves Commission
- Company NauTec Offshore
- DEGUWA (German Society for the Promotion of Underwater Archaeology
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- Deutsches Luftschiff- und Marinefliegermuseum
- Deutsches Technikmuseum Berlin
- Dorset Historic Environment Record
- East Sussex Historic Environment Record
- Elliot Smock
- Essex Historic Environment Record
- Fleet Air Arm Museum

- German Military Archives
- German Ministry of Defence, Press Centre
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- Parham Airfield Museum
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- RAF Museum (Hendon)
- Receiver of Wreck
- Romsey Sub Aqua Club
- Roncar Tower Museum
- Ross McNeill
- SVAS / The Shuttleworth Collection
- Simon Brown
- Solent Sky
- Southampton Historic Environment Record
- Southend Historic Environment Record
- Steven Jones
- Steven Winstanley
- Suffolk Historic Environment Record
- Swanage Boat Charters
- Sywell Aviation Museum
- The Dive Connection and Wight Diver Ltd.
- The International Group for Historic Aircraft Recovery (TIGHAR)

- The Muckleburgh Collection
- The National Archives (UK)
- Thinktank (Birmingham Science Museum)
- United Kingdom Hydrographic Office
- US Air Force Historical Research Agency
- USAF History Support Office
- US Naval Historical Centre, Naval Aviation Historical Branch/Curator Branch (Aviation Specialist Cultural Resources Section)
- USAF Materiel Command
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- West Sussex Historic Environment Record
- Will Lundy
- Yorkshire Air Museum & Allied Forces Memorial

Graham Scott and Euan McNeill carried out the assessment with assistance from Claudia Eicher. Graham Scott compiled the report. Euan McNeill compiled the draft guidance in **Appendix IX** and edited the report. Quality assurance was carried out by Steven Webster and Dr Antony Firth. Karen Nicholls prepared the illustrations. Tom Goskar and Graham Scott designed the associated web pages. Dr Andrew Fitzpatrick drafted press releases and advised on media strategy. The project was managed for Wessex Archaeology by Euan McNeill.

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A copy of the report will be sent to UKHO.

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Dedication

This report is dedicated to the members of the Goldfish Club, both past and present.

(The Goldfish Club was a loose and informal 'club' established during the Second World War for the survivors of ditchings)

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Pegasus XXII engine being recovered from the Pembroke Sunderland site (© Pembroke Dock Sunderland Trust)

Back Cover

'Fighter Ace – Air Chief Marshal Sir Keith Park' (© Graham Scott)

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1. INTRODUCTION

1.1.1. The English Heritage (EH) guidance note, *Military Aircraft Crash Sites* (English Heritage 2002) presents a compelling case for recognising the importance of aircraft crash sites and ensuring that they are considered where they are affected by development proposals and planning and development policies, or where research or recovery-led excavations are proposed. It notes that crash sites have significance for remembrance, commemoration, their cultural value as historic artefacts as well as the information they contain about the aircraft itself and its circumstances of loss (English Heritage 2002: 2).

1.1.2. This project has arisen as a result of issues raised by recent discoveries of aircraft crash sites in the course of Aggregate Levy Sustainability Fund (ALSF) projects and marine development. In particular, marine aggregate dredging has resulted in the discovery of a series of aircraft remains, which are being reported through the *BMAPA/English Heritage Protocol for Reporting Finds of Archaeological Interest* (Wessex Archaeology 2005a).

1.1.3. Such discoveries are presenting significant challenges to the marine aggregate industry, to the archaeologists that advise them, and to the archaeologists who advise the industry's regulator. Although in some instances the finds made by the aggregate industry appear to be relatively dispersed fragments, in other cases coherent sites have been found which, as a result of the application of Temporary Exclusion Zones, are resulting in operational restrictions on dredging in extensive areas that are otherwise licensed for aggregate extraction.

1.1.4. Existing knowledge with regard to the distribution, importance and appropriate management of aircraft crash sites on the seabed is generally regarded as being incomplete, poorly published and inadequate for the purposes of both curators and the marine industry alike. Furthermore public awareness and understanding of the significance of such sites as part of the United Kingdom's aviation heritage is thought to be poor.

1.1.5. This report therefore seeks to identify current gaps in knowledge and understanding relating to aircraft crash sites at sea in English territorial and near-territorial waters. It makes recommendations as to the further work required to remedy the deficiencies and gaps identified. It also formulates draft interim guidance for the marine industry on how such sites should be planned for and treated.

1.1.6. The report has been prepared on the basis of data available to Wessex Archaeology (WA) at the agreed deadline date. However for various reasons, it has not been possible for all of the parties consulted to respond by that date.

2. ASSESSMENT AIMS AND OBJECTIVES

2.1. PROJECT AIMS

2.1.1. The aim of this Scoping Study as set out in the Project Design (WA 2007) is to improve the understanding, valuing, care and public appreciation of aircraft crash sites at sea. In the first instance this can be done by providing a sound basis for the development of strategies for dealing with aircraft crash sites at sea discovered in the course of marine aggregate dredging.

2.2. PROJECT OBJECTIVES

2.2.1. The objectives of the Scoping Study are as follows:

- to review existing literature relating to the archaeology of aircraft crash sites at sea, existing guidance, and the legislative context;
- to clarify the range and archaeological potential of aircraft crash sites, by presenting examples of aircraft crash sites, which will include a range of site conditions and mechanisms affecting site survival, their management and investigation;
- to establish the relationship, in terms of numbers and composition, between the National Monuments Record (NMR) record of crash sites/casualties at sea, and the possible extent of the overall resource, the surviving resource of aircraft in preservation, and aviation history overall;
- to identify and describe possible additional sources of data, situated both in the UK and abroad, relating to aircraft crash sites;
- to gauge, by active engagement, public interest and values in respect of aircraft crash sites at sea;
- to summarise the role and interests of existing authorities and stakeholders in aircraft crash sites;
- to contribute to interim guidance for the marine aggregate industry on the reporting, management and investigation of aircraft crash sites at sea; to be forthcoming as part of the ALSF dissemination project;
- to make the results of the project available to specialist and general audiences, both in England and globally.

2.3. METHODOLOGY AND SPECIFIC OBJECTIVES

Review of existing literature, guidance, and legislative context

2.3.1. A wide and very extensive range of published and unpublished literature (including journals and society and popular periodicals) relating to aviation archaeology was reviewed. Literature was initially reviewed to provide general background and then specifically with regard to detailed project objectives. Published works and unpublished reports have been included in the references section below. An extensive web search was also undertaken, with upwards of 50 web sites being reviewed for relevant information.

Clarify the range and archaeological potential of aircraft crash sites

2.3.2. A range of sites have been researched, in a number of cases taking advantage of the results of recent unpublished research. They have been presented to illustrate as far as possible a typical range of inter-tidal, inshore and offshore site

environments and aircraft types, together with a number of different and quite distinctive research agendas.

2.3.3. The project has taken advantage of considerable geophysical and diving fieldwork previously undertaken by WA in relation to aircraft crash sites on the seabed and from the results of the Protocol Implementation Service (see below).

Establish the relationship between the NMR record of crash sites/casualties at sea and the possible extent of the overall resource

2.3.4. The extent of the available information concerning the number, type and distribution of aircraft losses over the sea in English territorial waters and near-territorial waters has been researched and reviewed using both primary and secondary sources, including currently active aviation researchers.

2.3.5. Searches have been undertaken of the NMR and sample Sites and Monuments Record / Historic Environment Record databases, the latter focussing on the south and east coasts of England from Dorset to Suffolk. This is because operational air activity was particularly concentrated there during WWII and also because of the number of aggregate extraction licences in this area. The information contained within these databases has been compared with the available information concerning the number of reported sea losses of aircraft to establish the approximate relationship between known sites and known losses.

Identify and describe possible additional sources of data, situated both in the UK and abroad, relating to aircraft crash sites

2.3.6. Searches and reviews have been undertaken to establish the extent and suitability of additional primary and secondary sources of information. Early in the project a significant discrepancy was established between the number of known crash sites and the much larger number of known sea losses. As a result the search and review of additional sources focussed principally upon locating records providing that would assist in identifying positions for known losses or areas where known losses are likely to be concentrated.

2.3.7. Considerable time was spent in seeking information from recreational divers and associated dive centres, charter boat operators and national organisations. In excess of 100 enquiries were sent out by e-mail and responses were followed up. The project received considerable publicity in the national diving press and on websites.

2.3.8. Considerable time was also spent in establishing what information is held by aviation museums and collections and aviation history and recovery researchers and associations. In excess of 75 enquiries were made in this respect. The project was publicised in specialist periodicals.

2.3.9. Publicity concerning the project also appeared in the marine industry industry press, for example *Dredging and Port Construction* and specialist archaeological periodicals and websites, for example the magazine of the Institute of Field Archaeologists. In all cases a response was invited, via the project blog or directly to the project team.

Gauge, by active engagement, public interest and values in respect of aircraft crash sites at sea

2.3.10. Public interest and values were explored through newspaper articles, in both national (e.g. *Sunday Telegraph*) and various regional and local titles (e.g. *East Anglian Times* and *Portsmouth News*). In addition project web pages and a project

blog were established. In both cases members of the public were invited to contact WA to provide a response to the project.

2.3.11. Attention was focussed on specialist public audiences, including recreational divers and aviation audiences as noted above. Articles appeared in the specialist diving and aviation press.

Summarise the role and interests of existing authorities and stakeholders in aircraft crash sites

2.3.12. Following initial background research a list of potential authorities and stakeholders was compiled, including the following:

- government authorities and agencies in the UK, Germany and the USA, including the armed forces and police;
- museums in the UK and Germany;
- local government archaeologists and other interested archaeological professionals;
- marine industry groups, for example British Marine Aggregate Producers Association;
- aviation and other interested archaeology researchers and associations and aircraft recovery groups;
- recreational divers and commercial organisations providing services to them;
- veterans associations and commemorative institutions;
- the general public;
- the media.

2.3.13. The identified stakeholders and authorities were then contacted and researched in order to establish what their roles and views were. Short news articles appeared in specialist press inviting comment, for example *Flypast*, *Dredging and Port Construction* and *Diver*.

Contribute to interim guidance for the marine aggregate industry on the reporting, management and investigation of aircraft crash sites at sea

2.3.14. Based upon the results of the study and upon WA's wider involvement advising the marine aggregate industry, draft interim guidance has been drafted (**Appendix X**).

Disseminating the results of the project available to specialist and general audiences, both in England and globally

2.3.15. The results of the project will be disseminated as follows:

- as a hard copy and digital report through EH;
- as a digital report through the WA website;
- as additional web page contact on the project web pages and blog, including a podcast;
- informal reporting to project contributors, including all international contributors;
- a continuing relationship with contributors including institutions, aviation researchers, archaeologists and recreational divers.

3. THE RESOURCE

3.1. AVIATION BACKGROUND

3.1.1. A detailed discussion of the history of aviation in the UK is beyond the scope of this study. Nevertheless some very broadly based background comment is necessary to provide a historical context for the following discussion of crash sites and losses.

3.1.2. Although aviation began in the UK in the 1800s in the form of ballooning, the history of fixed wing aviation in the UK did not begin until the early 1900s.

3.1.3. The first fixed wing flight across the English Channel was in 1909, following an earlier attempt in 1909 that ended with the aircraft ditching (http://www.rafmuseum.org.uk/milestones-of-flight/british_civil/1909.cfm). Although the first airliner flew in the USA in 1913, commercial civil aviation did not really get going until after WWI. Cross-Channel services to various European and worldwide destinations were established during the inter-war years. Services during WWII were intermittent but since then there has been a steady and then rapid rise in the number of commercial flights. Jets were introduced in the 1950s and by the end of the 20th century flight was an available means of travel within and to and from the UK for most people.

3.1.4. Prior to WWII both civil and to some extent military flights over the sea were uncommon, aside from regular scheduled services and maritime patrols. The reason is explained in the text of a lecture given by Group Captain E. F. Waring, Deputy Director of Air/Sea Rescue during WWII (AIR 20/24):

> "(Under peace-time conditions) The amount of flying carried out over the sea by land planes especially single engined aircraft was comparatively small and then not usually at any great distance from the coast…(it was) primarily caused by engine failures."

3.1.5. The history of military aviation in the UK is dominated by the two world wars of the 20th century and then by the Cold War stand-off. The First World War (WWI) saw the early development of military aviation and the beginnings of naval aviation. Balloons and airships were used in large numbers, with German Zeppelins being used to attack the UK across the North Sea and provide reconnaisance for the German fleet. Fixed wing aircraft were for the first time mass-produced in large numbers and German bombers raided targets in England. However the major theatre of war was in Continental Europe and there was comparatively little aviation activity over the sea.

3.1.6. The Second World War (WWII) was very different. Metal had largely replaced wood in airframe construction during the inter-war years and aeroplane technology had developed to a sufficient degree to make flying over the sea a less risky business. Until relatively late in the war the English Channel and North Sea formed a frontier between the Allies and Axis Europe. Early in the war Luftwaffe attacks on the UK were the predominant reason for flights over the sea whereas by mid-war this had shifted to Allied attacks on Continental Europe, principally by the great bomber fleets based in eastern England, and maritime patrols. This combined with the mass-production of aircraft in vast quantities meant that a huge amount of flying occurred over the sea.

3.1.7. Following the end of the war and until the early 1990s, military aviation in the UK was dominated by the Cold War. In addition to Royal Air Force (RAF) deployment,

large numbers of American planes were based in the UK and considerable operational flying occurred in the North Sea.

3.2. KNOWN LOSSES

The significance of known losses

3.2.1. A known loss is defined for the purpose of this report as being an aircraft which has been recorded as having been destroyed or abandoned, regardless of whether or not the site of the crash is known.

3.2.2. Knowing the number of aircraft losses that have occurred in UK territorial waters and specifically those bordering the English coast is important because it defines the size of the archaeological resource in terms of the potential number of sites.

3.2.3. Knowing where these losses have occurred is also important, largely because it provides a potential basis for the management of the resource and assists in identifying the crash sites that are found in the course of development and other human activities.

3.2.4. Knowing more about the aircraft that were lost is important because it assists in assessing the importance of the crash sites that are found. Assessment of importance is likely to be a key factor in determining how individual sites are managed and helps determine the significance and acceptibility of potentially adverse human impacts.

Data availability

3.2.5. No single definitive list of aircraft losses in UK territorial and near territorial waters appears to exist. The primary loss and other records on which such a list would be based appear to be incomplete and split between a number of different archives. Location information is often general or effectively absent (see 3.5).

3.2.6. Nevertheless a number of researchers have been active in this field and it is therefore possible to gauge the probable extent of known losses.

Numbers and causes

3.2.7. As part of the Monuments Protection Programme (MPP), EH carried out a survey of crash sites in England in consultation with the Ministry of Defence (MoD). The survey was concerned with both terrestrial and marine sites, but did not examine post-1945 crash sites.

3.2.8. A total of 28 fixed wing aircraft and 15 airships were lost by the German Imperial Air Service and Navy during raids on the UK mainland during WWI. During this period 34 aircrew from British Home Defence Squadrons were lost, suggesting a similar scale of aircraft losses (Holyoak 2002: 659). It is not known whether sea losses occurred, although information received by WA during the study suggests that they did. In addition research by the Midlands Aircraft Recovery Group has indicated that significant numbers of aircraft were lost in the UK through training accidents (Holyoak 2002: 659).

3.2.9. The MPP survey estimated that between 1939 and 1945 RAF Bomber Command lost 1,380 aircraft within the UK whilst either outward or inward bound on operational flights and, along with its Operational Training and Heavy Conversion Units, a further 3,986 aircraft in non-operational accidents. The same study estimated total Luftwaffe losses in and around the UK to have been about 1,500 (EH 2002:5 and Ramsey 1989).

3.2.10. The study noted that American losses were harder to determine because their records made little or no distinction between aircraft lost in combat over Continental Europe and those crashing on their return. However the UK-based VIIIth Army Air Force reported 1084 aircraft destroyed due to non-operational causes (Holyoak 2002: 660). The MPP study roughly estimated total American, British, German and Italian (Reggia Aeronautica) losses in and around the UK during WWII as being considerably in excess of 10,000 aircraft (EH 2002: 5).

3.2.11. The most complete information received by WA during the scoping study for WWII and the post-war period came from published aviation researcher Ross McNeill. WA have no means of independently verifying the accuracy of the data supplied by Mr McNeill, but it appears to have been prepared on the basis of the systematic study of a wide variety of primary and secondary sources. His data is held on MS Access databases and can be queried in a variety of ways, including geographically and by aircraft type.

3.2.12. Mr McNeill has recorded 11,090 RAF aircraft lost at sea between 1939 and 1990. The great majority of these appear to have occurred during WWII. He has also recorded 904 American and 1008 German losses.

3.2.13. Dr. Guenter Leonhardt of Luftfahrt-Museum Laatzen-Hannover estimates that there were around 1,000 Luftwaffe planes lost off Britain, with about 800 of these associated with the Battle of Britain (Dr Guenter Leonhardt, pers. comm.).

3.2.14. The Air Accident Investigation Branch (AAIB), which is the body charged with investigating civil air accidents in the UK, has records for 150 civil aircraft losses at sea since 1920. The great majority of the losses are post-war. However, the AAIB do not regard their pre-WWII records as being complete and comparisons with databases compiled by researchers, such as that in **Appendix IV**, confirm that it is not.

Distribution

3.2.15. The RAF losses recorded by Mr McNeill are in the North Atlantic, North Sea, English Channel, Irish Sea and Biscay areas. A total of 540 losses appear to have occurred in the English Channel. Losses recorded as being in southern and eastern English coastal areas can be broken down by county as follows (Ross McNeill e-mail):

- Cornwall 175
- Devon 143
- Dorset 101
- Hampshire 67
- Sussex 170
- Kent 380
- Essex 123
- Suffolk 73
- Norfolk 217
- Lincolnshire 118
- Yorkshire 216

3.2.16. The American and German sea losses recorded by Mr McNeill are in the North Sea and English Channel, with 409 of the latter specifically listed as being English Channel losses (Ross McNeill e-mail). This broadly accords with the estimates given by Dr Leonhardt.

3.2.17. The MPP study noted that WWII losses tended to be clustered along the southern and eastern margins of England. For example about 1,000 losses were noted for Suffolk, compared with only 500 for Warwickshire (EH 2002: 5). These areas would have formed the entry and exit points for offensive operations over Continental Europe, the North Sea and the English Channel. The majority of air combats appear to have occurred over these areas and the majority of airfields were based there. Some 1000 losses are estimated to have occurred over and off Sussex and Suffolk respectively (Burgess and Saunders 1990: 95 and McLachlan 1989: 195 respectively).

3.2.18. The data provided by the AAIB suggests a distribution around most of the English coast. Many of the more recent post-war losses reflect the intensive use of helicopters in the oil and gas industry of the North Sea.

3.3. KNOWN SITES

3.3.1. As of October 2007 WA were aware of total of 1977 aircraft related records held by the NMR in respect of aircraft crash sites and casualties in England and UK territorial waters bordering England. Of these 418 are described by the NMR as maritime aircraft crash sites. These sites are shown in **Figure 1**. Many do not represent located sites and are instead based upon loss records containing reasonably specific locations, for example “3 miles south of Beachy Head”. These appear to be very largely taken from secondary sources (they are fully referenced in this respect).

3.3.2. In the search area shown in **Figure 1** between Dorset and Suffolk, a total of 580 records of aircraft crash sites were traced in local SMR and HERs. These appear to be largely known sites, i.e. where some physical evidence of the aircraft has been located at some point.

3.3.3. UKHO wreck sites that are listed as aircraft are shown in **Figure 1**. The search area in this case is the median line in the English Channel and Southern North Sea. In contrast to the NMR, SMR and HER data, all of these sites are located with a high degree of precision. Only 28 aircraft sites are recorded by UKHO within this area.

3.3.4. NMR, SMR/HER and UKHO data has been uploaded into the project database in **Appendix I**. The total number of records is 2578, which contrasts notably with the figures produced by Mr McNeill. The NMR is the most comprehensive dataset, particularly in respect of loss records. Record counts by source are as follows:

- NMR 1977
- UKHO 28
- RoW 11
- Essex 4
- Suffolk 4
- Dorset 247
- Hampshire 63

- IOW 253
- Kent 16
- Southampton 1
- West Sussex 2
- East Sussex 15

3.3.5. Record counts by period from this database are:

- 1901-1913 2
- 1914-1918 6
- 1919-1938 45
- 1939-1945 2198
- 1946-2000 75

3.3.6. A significant concentration of crash sites exists around the coasts of Dorset, Hampshire and the Isle of Wight. This is not believed to be significant in terms of the actual distribution of aircraft crash sites on the seabed, but rather reflects local SMR/HER enhancement exercises (which then appear to have been uploaded into the NMR). Terrestrial concentrations in, for example Cumbria are also thought to be more representative of HER enhancement and the reported activities of recovery groups than the actual distribution of crash sites.

3.3.7. Even accounting for the limit of the NMR to territorial waters, the research that has been undertaken into sea losses of aircraft discussed above indicates that there is a great disparity between the number of losses that are recorded and the number of known sites.

3.3.8. This disparity is particularly notable off the south-east and East Anglian coasts where a comparison of the distribution of air/sea rescues in **Figures 2** and **3** with the distribution of sites shown in **Figure 1** suggests that the number and distribution of known sites falls far short of the totality of air loses over the sea.

3.3.9. Researcher and diver Ross McNeill has commented as follows with regard to the distribution of known sites (e-mail):

“Most of the currently known sites are located in the Channel within 50 mtr depth and in traditional net coastal fishing areas.

When sport diving started to increase in the 1970s it was usual for local groups to co operate with fishing boats to recover gear in exchange for lists of "sea bed fastners". This led to a number of aircraft wrecks on flat sea bed expanses in the 10 to 30 mtr range being examined by the sport divers and being reported to the Hydrographers department for inclusion in chart updates.

Outside the fishing grounds and for deeper waters the finds were significantly fewer and mostly limited to those found during cable laying operations to buoys.

In more recent times the new wrecks have been found by sports dive groups carrying out intensive area searches for shipping wrecks and survey work associated with offshore wind farms.

Taking sites designated as aircraft from the Hydrographers database and the Diver series of "Dive" books gives 68 in your declared area of interest. Approx 20% of these are now of doubtful existence due to collapse, sand movement etc."

3.4. AIRCRAFT IN PRESERVATION AND RECOVERED ARTEFACTS

3.4.1. Historic aircraft in preservation in the UK are listed in *Wrecks and Relics*, a biennial survey of preserved (in museums or other collections or undergoing restoration), instructional (static airfames used for training) and derelict airframes in the UK and Ireland (Ellis 2006). It is widely considered to be both a reliable and standard work. It is understood that similar lists of relevant aircraft exist for both Germany and the USA.

3.4.2. A full assessment of this resource, which numbers thousands of aircraft at hundreds of locations, is beyond the scope of this report. However, it is important to note that not all aircraft types survive in preservation and a significant number of important aircraft types are now 'extinct' (see below).

3.4.3. A large number of artefacts recovered from aircraft crash sites on the seabed are believed to exist at various museums and collections, for example at Tangmere Military Aviation Museum and Norfolk and Suffolk Aviation Museum. Information concerning the extent of the relevant material is being sought from a number of sources. The Receiver of Wreck holds only 11 Droits concerning aircraft related material recovered from UK territorial waters and it is thought that this is unrepresentative of the total amount recovered. This may be because droits received before the 1990s were collated locally or because of under reporting.

3.4.4. Some artefacts have been recovered as a result of marine aggregate dredging. These are currently being reported through the BMAPA Protocol Implementation Service. In the year ending 2006 over 25 finds were reported, from three sites (WA 2006b). In the following year 312 finds were reported, largely from one of three further sites (WA 2007e).

3.4.5. Discussions with the Metropolitan Police suggest that recoveries are undertaken by avocational divers, possibly with a view to selling the artefacts on. This suggests that undisclosed collections of material may exist. For example two German MG machine guns from a crash site on the seabed have fairly recently been seized by police (Ian Jones, Met. Police Civilian EOD Officer, pers. comm).This recovery was apparently undertaken by or on behalf of a known aircraft recovery group without the necessary licence (see below).

3.5. SOURCES

3.5.1. A primary (contemporary) source list has been compiled during the project (**Appendix II**). Secondary sources that have or may have information relevant to the objectives of this study have been included in the References section below. Given the disparity identified above between the numbers of known losses and known sites, the primary focus has been directed towards identifying those sources that provide information on loss locations.

3.5.2. The sources listed have been identified using information provided by the following (where possible they have been physically examined by WA):

- institutions such as the National Archives (TNA), RAF Museum and the Fleet Air Arm (FAA) Museum (FAAM);

- aviation researchers and authors such as Ross McNeill;
- aviation archaeology and recovery groups and associations such as British Aviation Archaeology Council (BAAC);
- web sources such as www.aviationarchaeology.com;
- bibliographies.

3.5.3. Positions are usually given by the primary sources consulted in one of four ways :

- conventional latitude and longitude;
- grid reference (for example a special air grid used by an airforce for overall control or an Admiralty letter-number code);
- bearing and direction to a navigational mark;
- general named location (Dungeness, off Southwold, North Sea, etc.).

3.5.4. The secondary sources consulted during this study do not generally deviate from whatever systems of location description are used by the primary sources consulted.

Air Historical Branch (AHB)

3.5.5. It is believed that the AHB hold a very large number of relevant records for the RAF. It is understood that these are held as a hard copy record and that this is not indexed for location. Full details of AHB's relevant holdings has been requested and are awaited.

3.5.6. It is understood that the AHB hold original records in respect of lost RAF aircraft. They are not digitised and are not easily searchable by location.

Civil aviation records

3.5.7. The Air Accident Investigation Branch (AAIB) was consulted with regard to civil aviation losses over the sea. They have provided a summary of the loss records that they hold (**Appendix III**). The first accident for which they hold records was in 1920. They do not regard the list as being comprehensive as not all losses were officially reported, notably in the inter-war period. The AAIB states that the locational information recorded has tended to be very general until recently.

3.5.8. Further information on some air accidents, both civil and military between 1919 and 1962 is available at TNA under AVIA 5. The records for each accident generally provide aircraft serial number and type, names of crew and an analysis of the cause of the loss with appropriate recommendations.

3.5.9. Civil air accident investigation reports for 1919 and 1921 in AVIA 5 were sampled (AVIA 5/1 and 5/3). Of the 10 reports comprising the latter, none were recorded as being lost at sea. The loss locations for the terrestrial losses were quite general and it is thought that similar reports on accidents over the sea are unlikely to contain more than general loss locations. Of the 14 reports comprising the former, only one was a maritime related loss, that of an Avro D.9343 that crashed on the foreshore at Southport, Lancashire on 21 August.

Royal Flying Corps (RFC)/RAF and Commonwealth records

3.5.10. The RFC existed from 1912 until 1918, when the RAF was formed by the amalgamation of the RFC and the Royal Naval Air Service (RNAS).

3.5.11. Air Ministry Form 1180 was designed to record details of RAF aircraft accidents. This enabled the causes to be analysed and the resulting data to be used in accident prevention. Although some of these forms survive from 1919, the bulk dates from 1929 onwards. They therefore cover the inter-war period, WWII and the post-war period. The original forms are held by the AHB, with copies being held on microfiche at the Department of Research and Information Services of the RAF Museum at Hendon. They are not indexed for location and the information recorded on the cards about where the accident occurred tends to be both highly variable and often very general. The limited number sampled gave very limited information about the fate of the aircraft and no positions for their loss.

3.5.12. Every aircraft in the RAF had an Air Ministry Form 78, commonly called aircraft movement cards. These record the units to which the aircraft was allocated and notes when it was damaged, repaired and its ultimate fate. The original cards, dating from the 1930's onwards, are held by the AHB and on microfiche at the RAF Museum. These cards appear to have been comprehensively studied by researchers compiling histories of individual aircraft and are considered further below.

3.5.13. Operations Record Books (ORBs or Forms 540 and 541) were compiled by all RAF units. The earliest squadron ORBs date from 1911. Those over 30 years old are held at TNA in class AIR 27, otherwise they are held by AHB, with access to bona fide researchers. ORBs are a record of daily events and list details of sorties undertaken by the unit concerned. Their contents depended to a certain extent upon the individual compilers and are therefore variable. However they can be expected to contain information about missions and accidents and losses that occurred during operations. Loss locations are usually either not given or are very general.

3.5.14. Combat reports for 1939-45 are held at TNA in class AIR 50. These provide general location information for losses and claims. Aircrew flying log books held in AIR 4 can also be expected to contain some location information.

3.5.15. Incomplete ditching reports dating from WWII exist for various types of aircraft at the TNA in class AIR 14. No co-ordinates are given in those sampled, but location information is included. For example AIR 14/1620 includes a report on the loss of Halifax LW 685 on 10 March 1944. The ditching is reported to have occurred 2 miles from Bridge of Don, Aberdeen at a bearing of 40 degrees. Halifax HX 265 is reported to have ditched 15 miles NE of West Hartlepool on 29 January 1944.

3.5.16. A number of 'K Reports', detailed reports on individual aircraft losses survive for the period 1943-5 at the TNA in class AIR 14/3466-3473. Of the reports sampled, relatively few of the losses reported on were ditchings, most occurring near the target or over continental Europe. Some give only a general location, such as the Halifax III LV 799 of 78 Squadron, which ditched 35-40 miles offshore after taking off from Breighton in Yorkshire on 9 July 1944. Others give co-ordinates, such as Halifax III MZ 576 of 10 Squadron, whose dinghy was spotted at "5209N 0202E" after it ditched on 28 October 1944. Similar reports exist in AIR 14/1617 for Lancaster aircraft.

3.5.17. Other WWII Bomber Command losses are reported in various document series in class AIR 14 at TNA. In addition loss statistics and summaries are in classes AIR 20 and 22.

3.5.18. Records concerning individual aircrew may also contain relevant information. For example the WWI War Graves roll in ADM 242/7-10 at TNA gives place of death. Commonwealth War Graves Commission records may also be useful in this respect.

WWII air/sea rescue and RNLI records

3.5.19. Both Allied and Axis forces in WWII operated Air/Sea Rescue Services. The RAF had dedicated air/sea rescue from 1940 and a Directorate of Air/Sea Rescue was formed in 1941 to provide a co-ordinated service based upon launches and aircraft.

3.5.20. Rescue efforts required a position for the loss. This could be established using radio direction finding equipment (DF), radar or positions reported in by either the casualty itself or a witnessing aircraft or ship. For various reasons a position given by radio or obtained by DF or radar could be some distance from the forced landing itself. The most accurate positioning is likely to have come from a witnessing aircraft or ship, but the quality of the positional information that survives for aircraft crashes depends largely upon what was required for record keeping. Furthermore many aircraft that were ditched under control appear to have floated for some time and are likely to have been moved by wind and tide away from the landing site. The same is true of rescued aircrew and there are a number of cases of aircrew being picked up more than 100 miles away from where they ditched .

3.5.21. The scale of the effort required was considerable. Some 1200 aircrew are known to have been involved in forced landings in the sea between February and the beginning of September 1941 (Air Ministry 1952: 26). In the 12 months between November 1941 and November 1942 there were 70 forced landings off the Scottish coast between Montrose and Oban (Air Ministry 1952: 53) and in the first 24 hours of D-Day in 1944 there were no less than 14 successful ditchings of C-47 Dakotas (Air Ministry 1952: 97). Even as late as March 1945 there were 79 known forced landings in the sea around the UK (Air Ministry 1952: 103).

3.5.22. The survival rate for aircrew forced to ditch in the sea rarely exceeded 60% at any stage in the war and for long periods was less than 40%. Even towards the end of the war prospects could be bleak, with only 84 out of a total of 291 (28.5%) being rescued in March 1945. There is some evidence in contemporary records that suggests that damaged Allied aircraft returning to the UK from Continental Europe would prefer to try to land or bail out over occupied territories rather than risk a ditching.

3.5.23. Numerous but somewhat fragmentary records survive for air/sea rescue at TNA. These were sampled for this study. AIR 20/4320 is Air/Sea Rescue Reports relating to individual incidents. A total of 27 rescues were examined, ranging in date from 1939 to 1941. The identity and/or type are given, together with a considerable amount of detail about the incident. However, in no case were co-ordinates given, positional information generally being limited to general location, such as “40 miles off Flamborough Head” and “Thames Estuary”. It should be borne in mind that in the circumstances recording the precise position for the ditching would not have been the first priority of either the resuer or the rescued.

3.5.24. Some RAF ORBs for air/sea rescue units survive. AIR 29/444, the record book for No.26 A/SRMCU (Felixstowe) (Air/Sea Rescue and Marine Craft Unit) for 1943-5 was sampled. It contains detailed reports on searches undertaken by the unit. Unlike the previous document it does give co-ordinates for searches and reported losses, describing for example the “search for fighter seen to crash at 51.59.40N 01.26.42E (1 mile from the beach)”. Generally however it gives little other detail of the aircraft concerned.

3.5.25. AIR 29/448 (part of the Air 29/441-449 series) was also examined. This contains the ORB and Appendices for Headquarters AS/R MCU for 1941-6. This lists air/sea rescue operations and gives locational information but no co-ordinates, for example "273 degrees transit 1-2 miles Porthcawl Light".

3.5.26. AIR 15/595 consist of weekly air/sea rescue reports for 1944. They give date, casualty and location details. The positional information is variable.

3.5.27. AIR 15/797 is "tables and charts of aircraft and shipping incidents 1949-51" relating to Coastal Command air/sea rescue.

3.5.28. Some miscellaneous documents that might not be expected to contain detailed locational information contain loss positions. For example policy papers AIR 15/402 at TNA record a number of loss positions at sea, for example a Liberator of the 2nd Bombardment Division lost at 54°10' N 07°40' E on 4 October 1943 and a Flying Fortress lost at what appears to be 3 miles north of Blakeney Point, near Wells , East Anglia on 13 May 1943.

3.5.29. A history and analysis of RAF Air/Sea Rescue efforts during WWII was compiled and issued as a restricted document by the AHB of the Air Ministry in 1952 (AIR 10/5553). Included within this document are a number of maps of "aircraft forced landings in the sea" for the UK, North Sea and English Channel approaches. The maps are organised chronologically and cover the period February 1941 to May 1945. Casualty locations are marked on the maps. Although the maps do not identify individual casualties they do show what the predominant type of casualty aircraft was (i.e. bomber, fighter, etc.) in each part of the map. The casualty locations shown are those fixed using radio DF equipment and casualties for which no DF fix was obtained are not shown (Ross McNeill e-mail).

3.5.30. These maps do appear to provide mapped data for aircraft losses. However there are a number of problems and uncertainties associated with them that significantly reduce their value:

- they do not identify individual casualties;
- they show the distribution of DF fixed casualties and it is not clear as to how representative of the total numbers of aircraft losses over water they are;
- the maps are small in scale and therefore the positions shown are not very precise;
- no details are given as to the sources of the DF data used to compile the plans, therefore the positions are of unknown reliability and cannot be checked;
- the positions are last known DF fixes and therefore it is not known whether they are representative of where the forced landings occurred;
- the maps are difficult to geo-reference and cannot be overlaid in a very satisfactory way (WA have used scanned copies of photocopies).

3.5.31. As a result it is unlikely that these maps provide a reliable guide to the location of individual aircraft crash sites. With the caveat that it is not certain how representative of the overall number of losses they are, they do however appear to provide a very useful guide as to the general distribution of maritime crash sites at any stage of WWII after February 1941. If it was to be possible to trace a list of positions and aircraft identities from which the maps were presumably compiled then this would be a significant advance in knowledge.

3.5.32. Relevant RNLI records are available in the RNLI publication 'Supplement to the Annual Reports of the RNLI 1939-46 (RNLI undated). This contains incident reports involving lifeboat launches. The entries for September-October 1940 were sampled for this study. Location information is given, but no co-ordinates. Examples include an incident involving a German aircraft that crashed near the East Last Buoy that resulted in the launching of the Margate lifeboat on 7 September and another incident involving the same boat on 11 September and an unidentified plane that was reported to have crashed 3 miles north of the lifeboat house.

RNAS and FAA records

3.5.33. Originally part of the naval wing of the Royal Flying Corps, the RNAS as a separate service existed from 1914 to 1918 when it became part of the Royal Air Force. From 1924 a Fleet Air Arm was created, coming under full Admiralty control in 1939.

3.5.34. The RAF Museum holds records on early WWI RNAS casualties and incomplete records of RNAS losses and casualties 1917-9 are held at TNA under class AIR 1 and 15.

3.5.35. Most individual records of aircraft in RNAS/FAA service prior to 1952 were destroyed in the mid-1950s (not all as is sometimes reported).

3.5.36. The Records and Research Centre at the FAA Museum (FAAM) is the principal repository for FAA records dating from WWII and the post-war period. They received their records from the FAA largely as a result of what appears to have been a 'clear out' by the Directorate of Air Warfare in 1992. Otherwise they have been transferred from various FAA sources in a piecemeal and incomplete fashion.

3.5.37. The FAAM hold Air Accident Cards for WWII on a database. However this contains no locational information other than the base of the aircraft involved and is listed by pilot name. Air Accident Cards are also held for 1954-1981. These cards include general locational information and are held on database.

3.5.38. The FAAM has a number of Squadron Diaries dating from WWII onwards which are similar to RAF ORBs. Some are also at TNA in class ADM 207, covering the period 1939-57.

3.5.39. The FAAM also has accident summaries and reviews, accident reports, airframe log cards and aircraft log books dating from the 1950s onwards. The accident reports contain location information but the series is fragmentary and there is no index listing by location.

3.5.40. TNA also holds aircraft operating ships' logs which may contain relevant information but these have not been sampled.

3.5.41. The FAA records for the post-1981 periodhave not been transferred to FAAM. It is understood that the Flight Safety & Accident Investigation Unit based at Yeovilton may hold other relevant records, including some records of pre-1945 accidents, but this is unconfirmed. It is also thought that the AHB may hold pre-1939 records as the FAA was the Fleet Air Arm of the RAF until 1939.

United States military aviation records

3.5.42. Relevant records exist for the United States Army Air Corps (USAAC) which existed until 1941, the United States Army Air Force (USAAF), which existed from 1941 to 1947, the United States Air Force in Europe (USAFE) which came into being in 1945 and for the United States Navy (USN).

3.5.43. American losses were recorded in daily listings of 'mishaps', official accident reports, individual aircraft record cards and weekly or monthly intelligence summaries. These records are held by US Air Force Historical Research Agency (www.maxwell.af.mil/au/afhra/). Copies are held at the US Air Force History Support Office (www.Airforcehistory.hq.af.mil/). US Navy aircraft record cards and accident summaries are held by the US Naval Historical Centre, Naval Aviation Historical Branch (www.history.navy.mil/branches/nhcorg4.htm).

3.5.44. However it would appear that the relevant primary records have been at least partly destroyed in respect of the USAAC and USAAF in relation to pre-1961 losses (see below). It is not thought that currently any institution maintains a consolidated database of losses (Erwin Roemer, RPA, Air Force Materiel Command e-mail).

3.5.45. Micro-film records of WWII US Bomb Groups are in existence. For example the 44th Bombardment Group operational records are held at the Albert F. Simpson Historical Research Center, MaxwellAir Force Base, Alabama. Missing Aircrew Reports (MACRs) are also understood to survive. Neither of these classes of record are understood to include anything other than general locational information.

3.5.46. The Aviation Specialist Cultural Resources Section of the Curator Branch Naval Historical Center in the US houses primary records for USN aircraft that may have been lost in UK waters. Their records are not complete and the approximately 30 known losses may be less than has occurred. Locational information is understood to be general (Wendy Cobble e-mail).

Luftwaffe loss records

3.5.47. Luftwaffe losses in and around the UK during WWII were kept in the Luftwaffe Quartermaster General's daily returns. These are held in microfilm form by the Imperial War Museum, London. They are incomplete, the records for 1944 having been lost.

3.5.48. A full analysis of these records was beyond the scope of the study and the data was therefore sampled. Losses for the period July-September 1940 were examined by a native German speaking member of WA staff and entered into one of the project data bases.

3.5.49. The data sampled (**Appendix V**) identifies the aircraft that were lost on each day but contains very little useful information relevant to location. No co-ordinates are given and the locations are general, for example "near Dover" or "grid square 146" (referring to the gridded map used to control German air warfare operations), and often ambiguous, for example "flying in the direction of London".

3.5.50. In addition to the Luftwaffe records, the RAF and USAAF compiled records of victory claims made by their pilots following air to air combat. RAF claims are recorded in various documents at TNA, including Fighter Command Combats and Casualties (AIR 16/960), individual squadron diaries (AIR 27) and Combat Reports (AIR 50). Locations are recorded consistently but they are only general, for example the German Do 17 claimed as destroyed "off Dungeness" on 10 July 1940 and the Bf 109 claimed as destroyed "2 miles east of Deal" on the same day.

3.5.51. One of the dangers of relying upon combat claims is that in the heat of battle it was often difficult for pilots to be sure about the results of their attacks. As a result Luftwaffe losses were consistently 'overclaimed' by Allied pilots. Despite the introduction of gun cameras for RAF fighters in 1941, for the entire war there

appears to have been an average of three claims for every two actual losses (Ramsey 1989: 9).

3.5.52. An official report at TNA (AIR 16/166) dated 16 September 1940 made by Squadron Leader Bell of the RAF stated that although 1900 victory claims had been made in the period 8 August to 11 September, only 316 crash sites had been located on the ground. The report stated that it was likely that more crashes occurred at sea (captured Luftwaffe pilots apparently told their interrogators that normal practice was to try to make it back to France if their planes were damaged). However, the reporter appears to believe that claim numbers were often greatly exaggerated.

3.5.53. RAF victory claims have been the subject of considerable published research. This is considered in the secondary sources section below.

3.5.54. In addition to victory claims made by the RAF, the claims made by Anti Aircraft (AA) Command during WWII merit consideration. Periodic reports appear to have been made by AA Command and these have been sampled in AIR 16/166 at TNA. The return of aircraft brought down by AA fire for the period 1 January to 8 January 1941 lists aircraft brought down in coastal locations but, apart from one Me 110, does not record whether they crashed on land or in the sea. The return for 18-25 December 1940 records several German aircraft that crashed into the sea, including a Do 215 at Portsmouth on 4 December and one unidentified aircraft that crashed into the Solent on the south coast. No co-ordinates or other details are given.

3.5.55. According to the Luftwaffe Press and Information Centre, neither the Luftwaffe nor the Bundeswehr hold records for pre-1945 aircraft losses. The German military archives in Freiburg have been asked whether they hold relevant information and a response is currently awaited.

3.5.56. The Luftfahrt-Museum Laatzen-Hannover is understood to house an archive of relevant information and to have significant in-house and associated expertise in aviation archaeology, potentially extending to German losses in UK waters. The Director of the institute is willing to assist but is seeking a meeting with project staff before any detailed information is exchanged.

Secondary sources

3.5.57. A huge number of published secondary works on aviation history exist. Many of these are specifically about air accidents and combat losses, or alternatively refer to them, for example as part of aircraft biographies. Due to the large number of titles, only certain particularly relevant works are discussed below.

3.5.58. There appears to be a striking lack of published archaeological reports for aircraft crash site excavations in the UK.

3.5.59. *RAF Bomber Command Losses of the Second World War* is a monumental nine volume list compiled by W R Chorley (Chorley various dates). It is considered the standard work on the subject and is based upon very extensive research of both primary and secondary sources. Whilst work of this scope will almost inevitably contain some errors, it is regarded as being generally reliable. The volumes contain a chronologically based list of all relevant RAF losses during WWII and the immediate post-war years.

3.5.60. Each entry contains details of the aircraft and crew and an account of the operation leading to the loss. Crash location details are given where available. These are normally general in relation to losses that occurred at sea and co-ordinates are not

given. The losses are indexed by date and the research as published is not searchable by location. Sources are referenced generally and not in relation to each loss.

3.5.61. A similar but smaller list entitled Royal Air Force Fighter Command Losses of the Second World War has been compiled by Norman L R Franks and published in three volumes (Franks various dates). It covers the period 1939-45. As with the survey by Chorley, it is considered the standard work and generally reliable. Details given, particularly about the circumstances of the loss, are generally brief. Loss location is always general and is not indexed. As with the bomber list, it is not always made clear whether aircraft that crashed in coastal locations went down in the sea or on land. As with Chorley, sources are referenced generally and not in relation to each loss.

3.5.62. A similar list in respect of Coastal Command losses has been part-published in a single volume by Ross McNeill (McNeill 2003). Similar comments to those in respect of Chorley and Franks apply in respect to McNeill.

3.5.63. In so far as records survive, a comprehensive history of RNAS and FAA aircraft has been published in another substantial multi-volume series by Ray Sturtivant (Sturtivant various dates).

3.5.64. Ross McNeill is a good example of the potential for dedicated private aviation researchers to contribute information relevant to aircraft losses on the seabed. In the course of his research Mr McNeill has compiled MS Access databases of a wide range of known or suspected sea losses, including known or suspected North Sea and English Channel Luftwaffe, American and RAF Bomber, Coastal and Fighter Command losses. RAF losses cover the date ranges 1939-1990 and for this period Mr McNeill has recorded 11,090 sea losses within the North Atlantic, North and Irish Sea, English Channel and Biscay areas. These databases represent many years work. They are flexible and can be queried geographically. Mr McNeill is a diver and this is perhaps reflected in the attention that he appears to give towards collecting information about crash locations.

3.5.65. Mr McNeill does not wish for the information contained in his databases to be transferred to any national or regional database at the present time because they contain collated content for further forthcoming volumes in his *Coastal Command Losses* series. However he has used them to assist other researchers with their enquiries and has provided significant information to WA during the course of this study.

3.5.66. The various aircraft recovery groups in the UK will undoubtedly hold information on aircraft crash sites. It is not clear how many hold information relevant to maritime loss sites and this may depend upon how accessible individual groups regard maritime sites. A database received from Nick Watherspoon of the Lancashire Aircraft Investigation Team (LAIT) lists a significant number of sea and intertidal losses. The information compiled by LAIT appears to depend to some extent on accessibility and only those sea losses that are believed to have occurred immediately offshore have been investigated. Further contact has been sought with recovery groups through BAAC and is awaited.

3.5.67. In addition to traditionally published sources a large amount of research into aviation losses is now being published on the web, either as simple lists or searchable databases. The Dorset Aircraft Crashes database, web-published at http://daveg4otu.tripod.com/dorset/dorcrash.html, is typical. It represents a

significant amount of research and contains useful, if general locational information (**Appendix IV**).

3.5.68. The AAIR database at http://www.aviationarchaeology.com/src/db.asp details USAAF losses. It is searchable by region and as these regions include North Sea and English Channel it is of use in respect of maritime crash sites.

3.5.69. Considerable private research has been undertaken on American air group losses during WWII. The web-downloadable 44th Bomb Group Roll of Honour and Casualties (Lundy 2005) is a good example, a 454 page study of the aircraft and crew losses suffered by that unit between 1942 and 1945 Comparison of these records with those of American fighters (http://www.littlefriends.co.uk/356thfg.php) suggests that the larger crew sizes of bombers was more likely to result in survivors. As a result there may have been a greater chance of more information being recorded about loss location. Post-war USAF (Europe) losses have similarly been researched by Andrew Horrex of Bentwaters Aviation Society and these include sea losses with general location details.

3.5.70. Published and web-based regional dive guides present information compiled through a variety of sources including, most significantly, the body of knowledge developed through recreational diving. *Dive Kent* (McDonald 1994) has been sampled as part of this study as it is a region which underwent an intensive period of air combat during WWII. A total of 365 dive sites are listed, the vast majority of which are shipwrecks or unidentified sites. Aircraft crash sites are briefly described and co-ordinates are given. However, only six of the sites are known to be aircraft.

Miscellaneous sources

3.5.71. The MoD operates a compensation scheme for damage caused to fishing gear through accidental collisions with military property on the seabed, including aircraft wrecks. Claims are made through the Marine and Fisheries Agency. They are investigated on behalf of the MOD by Royal Navy Flag Officer Sea Training, Plymouth and Scotland (Dee to the Humber and north of this respectively), unless they are for more than £8000, in which case they are dealt with through the MOD's Defence Claims and Legal department. It is understood that records are held by the respective Flag Officer for 10 years, after which they are either disposed of or lodged with the Naval Historical Branch.

3.5.72. Details of the aircraft remains responsible for causing the damage and the position of the collision are recorded (Lt Cdr Chandler, Flag Officer Sea Training Plymouth, pers. comm.). The records are primarily hard copy (they are currently submitted on RN Form S 1301), although Flag Officer Sea Training in Plymouth also holds summary details on spreadsheet from 1998/9. The quantity of claims submitted is not great, only 16 relating to aircraft having been made in the southern region since 2001. There is currently no public access to the records, other than by Freedom of Information Act request to the MOD.

3.5.73. Licence applications and subsequent reports may provide useful information on the location and character of aircraft crash sites, as well as a the scale of human impact upon them. Information is being sought from the MoD Joint Casualty & Compasionate Centre (Historic Casework Section) with regard to this.

3.5.74. Significant unpublished data on aircraft crash sites on the seabed may be held by recreational divers. To assess the potential of this source of data, over 150 e-mails were sent to recreational dive clubs and centres and charter boat operators. In addition the project was publicised through both diving related periodicals, web

pages and national organisations, inviting those with data to contact WA. Although this appears to have been well received, the number of useful responses was modest.

3.5.75. Nevertheless the responses received suggest that much useful information may be held by potential respondents. For example one researcher (Nick Roberts) who contacted WA holds a database of 115 crash sites off the Yorkshire and Humberside coast. This database includes site co-ordinates and details compiled from a variety of sources including divers but is also another example of a problem with this type of data in that the compiler is not willing for it to be published or otherwise added to a publicly accessible database at the present time. Divers operating off Dorset have also reported a number of aircraft sites to WA. Although these contacts have been positive, little further detail has been received other than photographs. There appears to be a reluctance to disclose positions for the sites in particular.

3.5.76. A number of HER enhancement exercises have been undertaken, for example in respect of Dorset and the Isle of Wight. Available information from recreational divers has been incorporated within these enhancements.

3.5.77. Some aviation museums and collections hold aircraft artefacts recovered from the sea. Information concerning the scale and origin of these holdings has been requested and is awaited.

4. RANGE AND POTENTIAL OF AIRCRAFT CRASH SITES

4.1. SITE FORMATION

Terrestrial crash sites

4.1.1. Terrestrial crash sites are beyond the scope of this study. Nevertheless an understanding of site formation processes on these may assist in understanding marine sites.

4.1.2. Aircraft making a forced landing are unlikely to have penetrated the ground significantly. They may have broken up, but subsequent clean up soon after the event is likely to have removed the wreckage, except perhaps in upland or difficult to reach areas.

4.1.3. Aircraft crashing into the ground are hitting a relatively hard surface. Large but fragile portions of the aircraft would break off on impact. Depending upon a variety of factors, including speed and angle of impact, weight and construction of the aircraft and the type of ground, parts of the aircraft, including the engines and severely compacted airframe could penetrate the ground, perhaps to a considerable depth. Subsequent clean up of the site by salvage crews could result in only a small surface debris field, although this might not occurr for crashes occurring in upland or other hard to reach areas. It is estimated that lowland WWII crash sites may yield only 1-10% in weight of the original aircraft (EH 2002: 3).

4.1.4. Terrestrial sites are likely to be impacted by subsequent human activity, for example agriculture or deliberate recovery. The rise in interest in aviation history and aircraft restoration in the last 30 years and the increasing use of upland areas for leisure has resulted in a significant depletion in the terrestrial resource. Aircraft recovery groups have been extremely active and the MoD estimated that approximately 1400 applications for excavation licences were received between 1982 and 2002

(Holyoak 2002: 662). There has also been a severe reduction in visible remains on upland sites (Smith 1997). The same impacts are likely to be experienced on inter-tidal sites unless, as in the case of the Harlech P-38, they have been buried.

Cause

4.1.5. With the exception of a few accidents that have befallen flying boats, aircraft on the seabed are there as a result of an in-flight accident or enemy action. The former encompasses a wide variety of causes, from pilot error, for example navigational error resulting in an aircraft running out of fuel, to equipment failure, for example fire and/or the loss of an engine, to collision. Loss due to enemy action may be immediate, i.e. when an aircraft is shot down during an attack, or delayed, for example if an aircraft is damaged by enemy aircraft or flak and is then lost on the way back to base as a result.

4.1.6. All of these root causes are evident in the loss record for aircraft that have been lost in UK territorial waters. Of the British WWII fighters losses sampled for this project, most appear to have been lost as a result of battle damage close to the scene of combat. For example on the 6th September 1940 Spitfire N3061 was damaged in combat with a JU 88 and the pilot was forced to bail out before the aircraft crashed in the English Channel off Portland. That same sampling process revealed that a significant number of bombers were lost as a result of battle damage whilst returning to base and after they had left the target area. For example on 24th September 1940 Whitley P5046 ditched in the North Sea whilst returning to its base at Linton-on-Ouse in Yorkshire following a raid on Berlin. The cause and general location of the loss can be established to a far greater for the fighters sampled because large numbers of the bombers are recorded as having been lost without trace.

4.1.7. Accidental causes are also well evidenced in the loss records sampled by WA. Two F-4C Phantoms of the US Third Air Force based in Britain collided in mid-air on 21st August 1972 over the North Sea, resulting in one aircraft crashing. Lancaster ED 392 ditched in the North Sea due to engine failure on 6th September 1943 and subsequently Wellington LN554 ditched due to lack of fuel on 23rd September 1943 whilst returning to base at Skipton-on-Swale following a raid on Hannover.

4.1.8. The cause of loss is clearly significant in understanding the nature of aircraft remains on the seabed. Clearly an aircraft that has exploded mid-air, perhaps as a result of enemy action or accidental fire, is likely to have broken up either partly or entirely before it reaches the sea. Inevitably the crash site is likely to be dispersed and probably more difficult to locate.

Impact

4.1.9. Aircraft landing on the surface of the sea do so in either an uncontrolled fashion, i.e. they crash, or a controlled (or semi-controlled) fashion, i.e. they are deliberately ditched. Whether the impact is controlled or uncontrolled is very likely to have a fundamental affect upon the condition of the aircraft when it reaches the seabed.

4.1.10. Ditching is a deliberate emergency landing on water. Although the majority of aircraft have never been designed for ditching, the statistical chances of surviving a ditching itself have always been reasonably high. UK and US data suggests that the current survival rate may be as high as 88%. Nevertheless analysis of historic loss data during this study suggests that during WWII some returning US and British bomber pilots who realised that they were not going to make it back to base preferred to turn back over enemy territory rather than risk having to ditch. Whilst localised sea and weather conditions and the time of day may have influenced these decisions, the uncertainties of air-sea rescue probably also played its part.

4.1.11. Ditching is normally accomplished into the wind if the sea is flat or smooth or along (i.e. parallel to) the swell in more moderate or rough conditions. A low impact speed under full control is the ideal, although if the approach is too slow then the aircraft can stall, resulting in a much more violent impact.

4.1.12. The force of the impact can have a key effect upon the damage sustained by the aircraft. The more violent the impact, the more damage that is likely to be sustained. If the ditching is not fully controlled then significantly more damage can be sustained, either through the aircraft twisting upon impact, for example in a stall, or through the additional impact forces of landing into the face of a wave. The latter has been compared in effect to crashing into a cliff and can cause very severe damage or even the total break up of the aircraft.

4.1.13. The design of the aircraft also has a significant influence on how it will behave during ditching. Aeroplanes usually have a nose high tail low attitude when flown near their stall speed. Therefore unless the aircraft has fixed undercarriage, the rear fuselage will strike the water first. As a general rule aircraft with long straight under fuselages are more suitable for ditching than aircraft with swept up rear fuselages because the latter has a tendency on initial impact to pitch up to a near vertical before collapsing forward into the sea with considerable force (www.pilotfriend.com).

4.1.14. There appear to have been some national differences. British designs seem to have been regarded as having better ditching qualities than American aircraft (Air Ministry 1952: 79).

4.1.15. Although the sea offers less resistance to impact than land, aircraft are not designed for uncontrolled landing on the sea and it is therefore always likely to result in very serious damage to an aeroplane. The extent of this damage will depend upon a complex range of factors including the shape and strength of the airframe, the angle and speed of water entry, damage previously sustained by the aircraft and whether explosive ordnance was carried. Total destruction and disintegration is possible. These factors will vary and interact in a way that will probably be unique to each loss.

4.1.16. Aircraft that have crashed into the sea in an uncontrolled manner are likely to sink immediately or shortly afterwards due to the damage that is likely to have been sustained upon impact. The condition that they settle upon the seabed appears to be, like initial impact damage, poorly understood. It is likely to depend upon a range of interacting factors, including water entry speed, water depth, seabed composition and morphology and aircraft shape and strength. In deep water a sinking aircraft may behave much like a sinking ship. A sinking plane may be subject to twisting forces and also to impact damage from collision with the seabed.

4.1.17. Aircraft that have ditched successfully can behave very differently. The aircraft is likely to have suffered far less damage from impact with the sea and many floated for at least long enough for the surviving crew to get out. Indeed Air-Sea Rescue records of WWII ditchings consulted by WA suggest that aircraft often remained afloat for 20 minutes or more. Indeed one aeroplane, an Anson lost on 29th November 1940 off St Eval, Cornwall was afloat for sufficiently long for salvage to be organised and attempted, although it subsequently broke up and sank whilst under tow (AIR 20/430).

4.1.18. As most aircraft are not designed to land on water, a ditched aircraft air frame is likely to be subject to considerable twisting and straining whilst floating. Contemporary records consulted by WA during the course of this study suggest that

it was not unusual for ditched aircraft to break up as they sank (the loss of wings or tail being sometimes noted). Subsequently as it sinks an aircraft is likely to be subject to similar forces as an aircraft that has crashed, except for water entry speed.

4.1.19. Aircraft do not generally have the mass or weight of shipwrecks. They are therefore less likely to penetrate the seabed surface to a significant depth as a result of impact or to subsequently sink into the seabed by means of their own weight. Furthermore if the wings remain attached these will probably act as floats in very soft seabed.

4.2. SURVIVAL

4.2.1. The factors that determine the degree to which aircraft crash sites survive once the aircraft is on the seabed appear to be poorly understood. A wide range of factors is likely to be involved. Interactions are likely to have been complex and therefore largely site specific. A comprehensive review of these factors is beyond both the scope of this report and of what appears to be the current state of knowledge. The following examples are therefore given:

Burial environment

4.2.2. Archaeologists traditionally view burial environment as being a crucial factor in relation to shipwreck sites. Aircraft wrecks are likely to be more fragile than shipwrecks and therefore burial environment is likely to be at least as important a factor in determining whether a site survives.

4.2.3. It is generally accepted that shipwrecks that are effectively buried shortly after or during initial site formation and remain buried can normally be expected to survive far better than those which remain unburied. The reasons for this are complicated and interacting but usually involve a stable anaerobic environment that additionally provides physical protection.

4.2.4. Very little published work appears to have been undertaken in this respect with regard to aircraft and the importance of burial environment. However, archaeological common sense and the examples considered below suggest that what is true of shipwrecks is likely to be equally if not more important for aircraft, which are intrinsically less massive and robust than ships.

4.2.5. Mark Evans of BAAC is not untypical in believing that intertidal sites appear to offer a better preservation environment and in having the opinion that burial, particularly in mud, is highly advantageous (Mark Evans pers. com.).

4.2.6. Burial environment is obviously linked to crash location, which is clearly a crucial factor in determining subsequent survival. Again it is partly a matter of common sense, shallow inshore environments (particularly hard seabed or beach environments) possibly being the worst case, although the example of the P-38 cited below demonstrates how easy it can be to confound generalised theories. Anecdotal evidence also suggests that moderately stable areas of deep sandbanks, such as the Goodwin Sands, also offer good preservation potential.

Materials

4.2.7. Aircraft are built from a wide range of materials that behave differently in a seawater environment and which can interact. Although the behaviour of materials in seawater environments has been subject to study in relation to shipwrecks, WA are not aware of any wide ranging study having been undertaken in relation to aircraft

sites. As a result the behaviour in seawater of materials used in the construction of aircraft, especially aluminium and its alloys, appears to be poorly understood.

4.2.8. Aluminium and aluminium alloys were commonly used for airframes during WWII and subsequently because of their lightness and rigidity. Pure aluminium is extremely reactive but oxide deposits that form on its surface will form a hard protective layer that makes it resistant to further attack. However, it will continue to corrode if this oxide is prevented from forming or if other metals are present, either within an alloy (such as calcium or magnesium) or as a result of galvanic reactions. Duraluminium for example, an alloy containing 4% copper, is more resistant to corrosion in the atmosphere but less resistant in seawater (Robinson 1998: 66-7). Aluminium and its alloys are less noble than iron and steel for example and will act as sacrificial anodes in their presence, causing rapid deterioration of the aluminium part. Galvanic corrosion is likely to be a serious problem on most WWII or later aircraft crash sites on the seabed.

4.2.9. Wartime production of aluminium could be subject to poor quality control. This has been suggested as the reason why some aluminium airframes are in a better condition than others (see below).

4.2.10. Some materials used in the construction of aircraft are organic or otherwise physically or chemically fragile, for example wooden airframes or organic fuselage cover material. Polymers such as rubber, paint and plastics were used extensively and their very long term properties are poorly understood.

4.2.11. A number of museums or aircraft collections are believed to have acquired aircraft parts recovered from marine contexts. Information with regard to condition and conservation experiences has been requested from them and is currently awaited.

4.2.12. Holyoak has pointed out that changes in aircraft construction and the meterials used mean preservation potential may depend upon when the aircraft was built (Holyoak 2002: 659-661). WWI aircraft were largely built from wood and doped linen and were comparatively light. In addition they were relatively low powered and impact speed would probably have been low. In a terrestrial environment these factors meant that there was likely to be little penetration as they hit the ground and the majority of debris would have remained on the surface, where it would have been easy to remove. Between the wars aircraft became heavy and somewhat more robust. Although recovery teams may have been more thorough in peacetime, their archaeological potential may be greater than WWI sites. By contrast WWII aircraft were much larger and heavier than their predecessors. They were characterised by monocoque construction and lightweight metals. Even accounting for galvanic corrosion WWII crash sites are generally regarded as having greater preservation potential (Holyoak 2002: 661).

Human impacts

4.2.13. The impact of commercial fishing upon aircraft crash sites is poorly understood and does not appear to have been subject to systematic study on any scale.

4.2.14. As noted above, the MoD pays compensation for damage sustained to fishing gear that is caused by military aircraft wreckage. Details of this scheme are given in 3.5.70-71. Although this may offer some information as to individual aircraft sites, it is unlikely to provide much useful information about the overall impact of fishing as it is likely to offer only a partial record of where snags have occurred.

4.2.15. Anecdotal evidence received during this study from members of the recreational diving community suggests that aircraft sites in shallow inshore environments may have been subject to significant damage from commercial fishing activities. Indeed one previously reliable correspondent who appears to have dived a number of aircraft crash sites off the Dorset over a number of years, was of the opinion that so much damage had already been done that there was little purpose in being concerned about it further. The suggestion was that little further damage was possible (name withheld, pers. comm.).

4.2.16. Anecdotal evidence from a number of correspondents and the relatively low number of recreational dive respondents suggests that aircraft crash sites are generally of less interest to the recreational diving community than shipwrecks. This is likely to be because known sites are relatively few in number and generally provide less enjoyable dives.

4.2.17. However those crash or other sites that have relatively intact aircraft may prove to be a considerable attraction for recreational divers. For example it is understood that a recreational diving centre has become involved in diving and studying a fairly well preserved C-47 off the Isle of Wight (Steve Nash e-mail), an aircraft discovered by WA in 1997 off Sandown (see below). The apparently well preserved Sunderland flying boat in the approaches to Pembroke Dock has also been subject to ongoing study by a recreational dive group associated with a trust set up to undertake its recovery and display (see below). The involvement of recreational divers on sites such as the Pembroke Sunderland can clearly bring benefits to such sites. Nevertheless there is inevitably a risk that over-frequent or careless use of well preserved aircraft crash sites for recreational purposes will result in significant damage.

4.2.18. It is not clear to what extent aircraft parts have been recovered from the seabed by recreational divers. The Receiver of Wreck has received only 11 droits (recovery reports) relating to aircraft parts. Whilst these reports have only been centrally collated since the 1990s and there now appears to be a widespread understanding that recoveries made from military aircraft crash sites are illegal without a licence, experience in relation to shipwreck sites suggests that this total is probably unrepresentative and that the total number of recoveries is likely to be considerably greater.

4.2.19. A large proportion of the known terrestrial crash sites have been subject to intrusive investigation and recovery. It seems to be widely accepted as fact that in a very significant number of cases this has been done for parts that can either be reused directly or used to create machine parts for the manufacture of parts for aircraft (usually ‘warbird’) restoration projects. It would appear that this can be a highly profitable enterprise, particularly for rare and/or famous aircraft. The standards of recording, whether archaeological or otherwise, and reporting historically appear to have been highly variable and the subject of considerable debate within the ‘aviation archaeology community’.

4.2.20. Contact with aviation researchers and restorers for the purposes of this study suggests that the process of recovering aircraft parts for the purposes of restoration may be moving from terrestrial to marine sites, particularly for those aircraft types or marks for which there are no longer unrecovered terrestrial examples. However, WA has come across no confirmed example during this study.

4.2.21. The recovery of aircraft parts from marine aggregates dredged from licensed areas in the North Sea has demonstrated that this industry is having an impact upon

aircraft crash sites. Sites that are subject to this dredging are likely to be destroyed, at least in part. The true scale of the recoveries is unknown as no systematic search of dredged material for aircraft parts is currently practicable. The reporting of such material is therefore largely dependant upon the observational skills of the dredger and wharf staff. The reporting Protocol adopted by the industry body BMAPA in the last few years does however mean that these finds are now reported and recorded. The Protocol Implementation Service has been in place since September 2005 and a supporting Awareness Programme has been running to provide training for wharf and dredger staff in what to look for. Aircraft material is being reported in this way, partially due to it aluminium composition and distinctive riveting and construction that make it stand out from other scrap metal.

4.2.22. It is likely that other forms of dredging impact upon aircraft crash sites, particularly in and around the approaches to commercial harbours. One anecdotal report received from a correspondent to the study who had worked on dredgers in the Thames Estuary suggests that aircraft parts were frequent and unrecorded finds on these vessels.

4.3. CASE STUDIES

4.3.1. The following sites are intended to illustrate a range of different site formation and preservation processes. They are not intended to be comprehensive:

Inland lake site – the Norwegian Ju-52

4.3.2. Inland lakes fall outside the present study. However, it is clear that they can offer site formation processes and environments that can result in outstanding levels of preservation that can offer a useful comparison with marine sites. This can be seen clearly in **Plate 1** This aircraft is one of 11 Luftwaffe Ju 52s that landed on a frozen freshwater lake near Narvik to resupply German troops during the invasion of Norway in 1940. It was lost when the lake ice melted and it fell through.

4.3.3. The aircraft is structurally intact with undercarriage lowered. The original paint is present on all major surfaces. Some major components are missing, including the port engine, centre engine, starboard propeller and engine cowling and flight instruments. These may have been lost as a result of salvage by either the Norwegian armed forces after the war or by recreational divers more recently. There is also some ice damage to the port wingtip, presumably incurred when the aircraft fell through the ice.

4.3.4. The lake itself is steep sided and up to 60m deep. It is fresh water filled. The aircraft is close to a feeder stream and is slowly being covered by alluvial deposits. As a result the tail of the aircraft is buried.

4.3.5. It would appear that the dramatic preservation of this aircraft is a combination of the fact that it is effectively a landing site rather than a crash site, it is in cold fresh water and access as a recreational dive site is apparently difficult (Simon Brown e-mail).

4.3.6. Another of the Ju 52s lost in this lake appears to have been recovered by or on behalf of the German Luftfahrt Museum in Hannover-Laatzen. Although WA have not been able to examine this aircraft, pictures received of the recovery suggests that it may be in even better condition than the aircraft that remains *in situ* (Göpfert et al undated).

4.3.7. Other noteworthy examples of the excellent preservation potential of fresh water environments include the Vickers Wellington recovered from Loch Ness in 1985

(Holmes 1991) and the Junkers 88 recovered from the Kilsfjord of Norway (Holyoak 2002: 659).

Intertidal site – the Harlech P-38

4.3.8. In July 2007 the well preserved wreck of an aeroplane was discovered in beach sand immediately seaward of the low water line on Harlech Beach in Wales. It was subsequently identified through research as being a Lockheed P-38F Lightning twin-engined fighter (**Plate 2**) and probably USAAF 41-7677, lost as a result of a training flight accident in September 1942. It is therefore arguably the oldest surviving P-38 in the world (Clauss et al 2007: 5).

4.3.9. Considerable documentary evidence for this aircraft and its pilot still exists. This has enabled a detailed history of the aircraft to be compiled, together with a biography of the pilot.

4.3.10. The aircraft was subsequently the subject of an archaeological survey and a preliminary recovery feasibility study by the US-based organisation The International Group for Historic Aircraft Recovery (TIGHAR)

4.3.11. The aeroplane is unusually well preserved. As of October 2007 the front half of the wreck was exposed. Metal detector and probe searches suggested that the whole aircraft was intact. Corrosion appeared limited and the observable section was very largely intact (Ric Gillespie of TIGHAR refers to some corrosion caused by bacteria in an e-mail to WA). Approximately 50% of the unburied airframe was free of marine growth. In places what appeared to be the original olive drab paint coat could be seen.

4.3.12. Analysis suggests that the parts that are missing, such as the starboard propeller assembly and the left wingtip, may well have been lost during landing (Clauss et al 2007: 20) and therefore the aircraft may be almost perfectly preserved in the state that it came to rest in after crash landing. In the context of a UK site that can be reached on foot, this is very rare.

4.3.13. A shallow salt water environment might well be considered a worst-case scenario for the survival of a historic aircraft. The fact that this aeroplane has survived in such good condition is a strong indication that simplistic characterisation of site environment is not a reliable guide to preservation potential.

4.3.14. TIGHAR believes that a combination of factors has contributed to the survival of this aircraft. The beach slopes gently and a sand bar lies to the seaward. As a result the aircraft lies in a shallow depression between this bar and the low water line and is therefore protected on all sides. The fact that it does not appear to have been seen before and is in such a good state of preservation suggests that it has been buried in sand for most if not all of the time since it landed. The beach is reported to be subject to longshore drift and TIGHAR believes that it is this steady movement of sand that has kept the site buried until now, although the reason why the site has uncovered is not known. In addition two freshwater streams run onto the beach very close to the site and these may be responsible for the creation of the sand bar. TIGHAR believes that the fresh water from these streams may have reduced the salinity of the aircraft's environment (Clauss et al 2007: 21). As can be seen from the JU-52 example above, a freshwater environment is capable of preserving an aircraft in extremely good condition.

4.3.15. All P-38s had aluminium airframes. However, the P-38 is a pre-war F model delivered to the USAAF in May 1942. It is thought that aircraft which were built

either pre-war or early in the war used a relatively high grade of aluminium that was relatively free of impurities. This therefore makes them more resistant to salt water corrosion. TIGHAR believes that this may be a factor in explaining the unusual level of preservation.

4.3.16. Since October the site has been observed to be reburying (Clauss et al 2007: 20). This is desirable as an exposed site could be expected to deteriorate rapidly. The site was reported to have been reburied in January 2008 (Peter Fix, e-mail).

4.3.17. The TIGHAR report does not refer to any human interference with the site since its discovery. However, a member of the RAF Museum staff has told WA that he has recently been informed that a person known for unlicensed recovery of aircraft parts has recently been seen in the vicinity of the aircraft.

4.3.18. Human remains are not present and TIGHAR hopes to recover the aeroplane if a licence can be obtained and a suitable and willing UK receiving museum identified. TIGHAR wish for the aircraft to be conserved and displayed and not for the aircraft to be restored. It is understood that any recovery will be subject to a positive engineering feasibility study. Harlech Beach is a designated SSSI and this may complicate recovery plans considerably.

Inshore site – the Pembroke Sunderland

4.3.19. In November 1940 RAF Short Sunderland Mark I flying boat T9044 sank at its moorings off Pembroke Dock, Wales, without loss of life. Despite a chronic shortage of similar aircraft, it was not salvaged at the time.

4.3.20. In 2003 the wreck of the aircraft was discovered by local recreational divers who were recovering lobster pots. Subsequently it came to the attention of the media and a television documentary based upon a diving investigation of the wreck and the recovery of an engine and other parts was produced in 2004 (**Front Cover Plate**).

4.3.21. The site has been investigated by divers (http://www.channel4.com/science/microsites/W/wreck_detectives/prog_sunderland.html and John Evans pers. comm. and e-mail) and, most recently, by geophysical survey (Isherwood 2007). Combining the reports made through both methods allows a good picture of the wreck to be built up.

4.3.22. The aircraft lies at a depth of 16-18m on the northern edge of the main channel into Pembroke Dock. Most of the fuselage appears to be intact. However, the tail fin which is missing and the fuselage forward of the wing roots is partially collapsed. In addition the upper surface of the fuselage aft of the wing roots is damaged or missing. The rear turret remains fully intact, although it appears to be detached. The starboard wing is missing and unlocated, although there is debris where it would be if attached. The port wing is not in its original position but is still attached to the fuselage (the wing tip has become detached). One of the port engines is *in situ* and exposed. Although the aluminium airframe has suffered from corrosion, much of it is still in remarkably good condition.

4.3.23. Although the wreck does not appear to have sunk into the seabed, sediment appears to have built up around it. This and possible fresh water stream flows in the vicinity may be responsible for the good condition of the remaining parts of the aircraft.

4.3.24. The site is well protected. It lies within the area administered by Milford Haven Port Authority and they are supportive of the project. As a result a 100m exclusion zone

has been set up. In addition the site is well known and valued locally. It is visible from the shore and is, apparently well watched. Nevertheless fishing pots are sometimes found on or near the site and there will always be the threat of carelessly deployed yacht anchors. In the longer term however channel capital or maintenance dredging may pose a bigger threat.

4.3.25. The Pembroke Dock Sunderland Trust has been set up with the aim of recovering the aircraft and of conserving and displaying it. The trust has received HLF funding for a feasibility study and anticipate making a major HLF bid in 2008. The trust is in the happy position of having a member of staff seconded from the National Park Authority who is a published Sunderland expert.

4.3.26. The trust is an entirely local initiative building on considerable local enthusiasm and the intention, amongst others, to provide an additional heritage attraction in an area whose economy is partly tourism-based. The Trust has secured land for the necessary buildings from the developers of the former royal dockyard at Pembroke. The facility will be called the 'Battle of the Atlantic and Story of Flying Boats Exhibition Centre' (John Evans pers. comm.).

4.3.27. The Sunderland is associated with the former RAF Pembroke Dock, which became the world's largest flying boat base during WWII. At one time 99 flying boats were based there (http://www.pdst.co.uk/pages/pembrokedock.html), fulfilling a vital role in the Battle of the Atlantic. The recovery and display of the Sunderland would therefore also be used to showcase the dock's significant past.

4.3.28. In preparation for this, WA understands that the trust has been recruiting veteran volunteers to provide advice and knowledge for the study and recovery of the aircraft and to provide oral history. The aircraft has been identified and documented and a former pilot has been traced (http://www.pdst.co.uk/pages/derekmartin.html).

4.3.29. The Sunderland is an iconic aircraft that played an important role in the defeat of Nazi Germany's U-boat fleets in WWII and therefore in the winning of the war (**Plate 4**). No airworthy examples are known to survive and only three examples are currently in preservation. The Pembroke Sunderland is unique in being the only confirmed surviving example of a Mark I aircraft (a Mark I in excellent condition is reputedly in Loch Ryan). It would not actually be the first preserved Sunderland to be displayed in Pembroke. The example currently in the collection of the RAF Museum was formerly displayed in the open at Pembroke Dock during the 1960s.

4.3.30. The Pembroke Sunderland is significant for a number of reasons. In addition to being a unique survival of a famous aircraft, it demonstrates the value of integrating geophysical and diver investigations. It points to factors, burial and fresh water streams, that may be significant in preserving inshore aircraft sites. It provides an example of how the significance of an important terrestrial monument can be enhanced by its association with an aircraft and vice-versa. It demonstrates that there is scope for the study and recovery of aircraft to contribute significantly to the promotion of heritage in local communities. Furthermore it suggests that funding streams may be available for this purpose.

Offshore dispersed site – unknown aircraft in marine aggregate dredging Area 430

4.3.31. Area 430 is an area of the southern North Sea approximately 27km offshore of Southwold, Suffolk that is currently licensed for marine aggregate dredging. The Area was the subject of an archaeological assessment by WA in May 2006. At that time no aircraft crash sites were recorded in Area 430 by either the NMR or UKHO

and no aircraft related anomalies were identified in the geophysical data for the Area.

4.3.32. In summer 2006 two isolated finds of aircraft wreckage were made during dredging in the Area. These finds were reported to WA through the Implementation Service of the BMAPA/EH Protocol for Reporting Finds of Archaeological Interest. These included a rudder pedal which was subsequently identified by RAF Museum staff as being from either a P-51 Mustang or a B-25 Mitchell bomber (WA 2007c: 2). Other parts, including a lamp, were not identified as being from any particular aircraft, although the other group of finds was thought most likely to be from a German aircraft.

4.3.33. In January 2007 three further finds of aircraft wreckage were made in Area 430, including one containing human remains (**Plate 3**). Unlike the finds reported in 2006, investigation of these finds identified them as being German. They included a saddle magazine from a German MG 15 machine gun, part of a bomb distributor and other parts thought most likely to have come from a Ju 88, a twin-engined monoplane bomber and nightfighter flown in large numbers by the Luftwaffe during WWII (**Plate 4**). Further analysis of the parts suggested that the loss most likely occurred in the second half of August 1940, although the actual aircraft involved has not been identified.

4.3.34. It is not known whether additional finds that were not spotted and retrieved were recovered by the dredgers concerned.

4.3.35. The seabed in the area is highly mobile and dreding scars are quickly obscured by the mobile sediment. It is thought likely that the finds were recovered from a thin veneer of sand and gravel overlying the main aggregate deposit but it is not known whether they were surface finds or buried.

4.3.36. Precise locations for the findspots are not known because the finds were only spotted only when they had already been removed from the site and were aboard the dredger or on the dredging company wharf. No obstructions were identified on the seabed during dredging and no significant aircraft structure is reported to have become caught in the vessel draghead. Locational information for the finds is therefore limited to the dredging track for the load from which they were recovered. An association between the individual finds is therefore uncertain.

4.3.37. Subsequent archaeological analysis of geophysical survey data for the dredging lanes identified 368 anomalies, of which 203 could be aircraft related (WA 2007c: 5). Although the probable location of the finds was refined to small areas of the original temporary exclusion zone (WA 2007d), no large anomaly that could be a coherent aircraft wreck was identified. The finds recovered from Area 430 are therefore thought to have been isolated remains rather than part of coherent crash sites. The lack of any significant obstruction encountered during dredging and the absence of clear evidence for the presence of an aircraft in geophysical data analysed before the dredging operations (WA 2006c) suggests that dredging is not responsible for the dispersal. However, two concentrations of anomalies were noted, which suggests that the finds may come from the debris fields of two or more aircraft. The dispersed nature of the evidence suggests that the aircraft may have broken up, possibly in mid-air or as a result of impacting the sea at speed. Alternatively it is possible that the aircraft broke up subsequently, conceivably as a result of commercial fishing activities.

4.3.38. Isolated finds without a proven site context and limited locational information are the difficulties typically faced when dealing with aircraft remains recovered through marine aggregate dredging. Dredging companies can sometimes add information that can allow the probable location within a lane to be identified but a precise location is only likely to be established if the aircraft wreckage is of sufficient size to obstruct the draghead. Unfortunately the extent to which aircraft remains are likely to obstruct a draghead is poorly understood. Both of these problems are clearly illustrated by the finds made in Area 430.

4.3.39. The extent to which finds are damaged or otherwise altered by a dredging system during recovery or subsequent processing is also not fully understood. Furthermore recovery of finds in this way depends upon the observational skills of the dredger and wharf staff. Finds tend to be small and their size and colour can make them very hard to distinguish at a distance from the sand and aggregate load that they are recovered in.

4.3.40. Experience suggests that little material is spotted on the dredgers themselves. There is limited sorting of metal inclusions in the aggregate at the wharves but there is little evidence to suggest how reliable this is. Given that the recovery of archaeological material is not a key responsible of either dredger or wharf staff, common sense suggests that only a proportion of finds recovered in a load are therefore likely to be spotted and retrieved. However, no studies have been carried out to determine what proportion of finds are actually retrieved from the loads.

4.3.41. Furthermore the extent to which the finds are then recognised as important and actually reported is also uncertain. Experience certainly suggests that under-reporting has been the norm. The application of the Finds Protocol and the associated Awareness programme are seeking to address this issue.

Inshore site – the Sandown C-47

4.3.42. In 1997 WA investigated and identified the wreck of a C-47 Dakota (**Plate 4**) during diving investigations undertaken in advance of the construction of an outfall at Sandown, Isle of Wight.

4.3.43. The site was in fact identified as a wreck in 1989 in the course of a hydrographic survey. However it was not identified as an aircraft. The WA diver survey established that it was a twin radial engined aircraft. The site consisted of a central wing section with two engines, lower fuselage and associated fixtures and fittings including oxygen cylinders, elements of the undercarriage and propellors (**Figures 4** and **5**).

4.3.44. The diving survey took place in two phases. Following the first phase of diving the tentative conclusion reached was that the aircraft had been deliberately ditched. This was because it was thought that the coherence of the central wing sections and the engines could not be explained if the aircraft had crashed at high speed (WA 1997a).

4.3.45. Additional data gathered during the second phase of diving allowed this theory to be confirmed and elaborated. Additional time on site allowed the divers to confirm that significantly more of the aircraft survived than first thought (WA 1997b).

4.3.46. The base of the fuselage, together with the port wing outboard of the engine was discovered *in situ*, reinforcing the initial theory that the aircraft had been ditched at relatively low speed. It was also noted that the starboard wing outboard of the engine was missing and that the blades of the starboard propeller (which was

detached) were bent and those of the port were not. This suggested that the landing was not level and that the starboard wing tip touched the water, causing the outer wing to disintegrate and the propeller to become detached. The landing was therefore not entirely successful. This theory was reinforced by evidence for rapid sinking. The detached starboard propeller was close to the aircraft and fragments of what was probably the aircraft's life raft were still onboard. The absence of evidence for the aircraft's tail also supported the theory that the aircraft landed badly and sank fast. The tail may well have broken away upon landing.

4.3.47. The site was also subject to a side-scan sonar survey following the initial phase of investigation. This was not successful in that although the site was visible as an area of disturbance, detail was not apparent. Furthermore the nature of the surrounding seabed made it hard to distinguish any anomalies. Although slight areas of disturbance to the north and east of the wreck may have been additional wreck material, no firm conclusions could be drawn.

4.3.48. No human remains were found in either phase of diving. However the report concluded that the nature of the wreckage suggested that casualties were likely to have occurred (WA 1997b).

Offshore intact site - B-24 Liberator

4.3.49. A crashed B-24 was found by WA during another ALSF funded study. This discovery illustrates another difficulty associated with the investigation of aircraft sites, that of distinguishing them from shipwrecks. It also illustrates the potential for excellent survival of organic artefacts on buried crash sites.

4.3.50. This site was recorded by UKHO as being a small, intact, possibly wooden wreck lying in over 50m of water off Hampshire. Geophysical survey, including multibeam swath bathymetry survey, was undertaken by WA in advance of an ROV investigation (**Figure 6**). The site was not identified as that of an aircraft during the geophysical survey.

4.3.51. However ROV survey of part of the site found four well preserved aircraft engines attached to the wings or wing sections. The aircraft appeared to have partially broken up and the wings were not attached to the fuselage. However the proximity of the parts suggests that the break up did not occur before the aircraft hit the sea. The aircraft appeared to be lying upside down.

4.3.52. Most of the surviving structure was partially or fully buried. The presence of numerous well preserved textiles, including American clothing (notably the remarkably well preserved flying jacket (parka) shown in **Figure 6**), on and around the site suggested that the limited exposure had occurred recently and that the site must have been buried for all or most of the period since the crash. The reason for this apparent change in the condition of the site was not established.

4.3.53. Notwithstanding the presence of clothing, no human remains were observed during the survey.

4.3.54. The subsequent involvement of the RAF Museum and of the 388th Bomber Group Collection enabled the site to be identified as being that of a Consolidated B-24 Liberator (**Plate 4**) and therefore possibly a USAAF plane lost during WWII (WA 2007a: 9) . The actual aircraft involved has not been identified.

4.3.55. No further archaeological survey work is anticipated on this site in the foreseeable future, unless it is subsequently adopted as a research project by avocational

divers. It has now been reasonably well publicised through the WA web site and therefore it is possible that it may be visited as a recreational dive site.

Conclusions

4.3.56. The following conclusions can be drawn from the above examples:

- A complex range of interacting factors underpin both aircraft crash site formation and preservation and extrapolating general principles is therefore difficult;
- The potential exists for some aircraft on the seabed to be preserved in a remarkably good condition;
- The nature of the impact (i.e. controlled ditching or crashing) may be crucial in determining the level of preservation;
- Artefacts associated with aircrew can be preserved in remarkably good condition but it can be difficult to establish whether human remains are present;
- Inshore or inter-tidal locations though apparently hostile do not necessarily preclude such survival;
- Burial appears to be a common factor in respect of good levels of preservation;
- The existence of freshwater streams within or close to a site may also be a factor in good preservation but the absence of this and/or burial does not preclude good survival;
- The quality of aluminium used may be significant in determining whether an aircraft is well preserved;
- It is difficult to rely upon geophysical survey alone to accurately locate or identify aircraft crash sites on the seabed;
- Particular problems are faced in relation to locating and identifying aircraft in advance of and during dredging operations.
- A large proportion of sites are capable of being identified or enhanced by documentary research, but this will normally also require fieldwork and perhaps artefact recovery.

5. MANAGEMENT

5.1. EXISTING GUIDANCE AND LEGISLATIVE CONTEXT

Ownership

5.1.1. All crashed British military aircraft in the UK or its territorial waters are deemed Crown property until such time as the MoD disposes of them.

5.1.2. Crashed enemy aircraft, including all Luftwaffe crash sites, are considered captured property surrendered to the Crown.

5.1.3. All crashed US military aircraft in the UK or territorial waters are deemed property of the United States Government. However, the UK MoD acts on their behalf.

5.1.4. The USAF records repository was destroyed in a fire in November 1961. As a result the USAF abandoned all ownership rights to all USAAC, USAAF, USAF and USAFE

planes lost prior to that date. Disposition of the aircraft remains is determined by the local/state entities involved. This does not apply to USN aircraft or where there is any doubt as to whether the aircraft is USAAC or USAF. Department of the Navy ship and aircraft wrecks are US Government property in the custody of the U.S. Navy. They remain US Government owned until specific formal action is taken to dispose of them.

5.1.5. US authorites take the identification and possible repatriation of human remains associated with their crashed aircraft very seriously even where they have abandoned there ownership rights. The presence of human remains should be reported to Joint Casualty & Compassionate Centre of the MoD's Serrvice Personnel & Veterans Agency (JC & CC) who will liase with the US authorities, principally the Joint Personnel Accounting Command (JPAC) who have responsibility for identifying missing US service personnel.

5.1.6. Ownership of civilian aircraft wrecks in territorial waters will generally vest in their original owners or their successors in title (notably insurers).

Protection and licensing

5.1.7. All crashed military aircraft or civilian aircraft that were lost during military service in the UK and its territorial waters are automatically designated as 'protected places' under the Protection of Military Remains Act 1986 (PMRA).

5.1.8. The Act makes it a criminal offence to interfere with the wreckage of any crashed, sunken or stranded military aircraft without a licence. This is irrespective of loss of life or whether the loss occurred during peacetime or wartime. The Act applies to aircraft that were in the military service of any country if they are in UK territorial waters but is limited to aircraft that were in UK military service if lying in international waters. Enforcement of the statute is by the state and its agencies.

5.1.9. Diving is not prohibited on an aircraft designated as a Protected Place. However, it is an offence to conduct unlicensed diving or salvage operations to tamper with, damage, remove or unearth any remains or enter any hatch or other opening. Essentially, diving is permitted on a 'look but don't touch' basis only.

5.1.10. Licences can be issued to enable activities to be undertaken in relation to crashed aircraft that would otherwise be offences under the PMRA. These have previously been issued most commonly in a terrestrial context to enable individuals or groups to recover aircraft or aircraft parts from crash sites. Licences are issued to a named individual. They are valid for one year and apply to a defined area. Licences are not issued exclusively as the MoD is not prepared to grant sole rights of recovery to one individual. For a licenced to be issued the identity of the aircraft has to have been establised so that research can be undetraken into assessing, primarily, the likely presence of human remains.

5.1.11. Where human remains are not thought to be present very few licences are refused, with JC&CC suggesting that it possibly averages one refusal per year in the period 2003-7 (JC&CC, letter to WA). The two main reasons for refusal are the presence of human remains or danger due to the presence of unexplded ordnance. Licences may also be turned down if the site is within a Site of Special Scientific Interest (SSSI).

5.1.12. However, the existence of human remains is not an absolute bar on excavation. It seems that the wishes of the landowner upon whose land the aircraft remains are can overide this concern. In 2004 a licence to excavate a German Dornier aircraft

was initially refused because of the possibility that human remains were present. However, this decision was later reversed on the basis that the landowner wanted the work to go ahead (JC&CC, letter to WA).

5.1.13. Far more licences are issued for terrestrial crash sites than are issued for inter-tidal or marine sites. Of the 156 licences issued in 2003-7, only 10 (6%) have been for inter-tidal or marine sites and of these five were annual repeat applications in relation to the same aircraft , the Pembroke Sunderland (JC&CC, letter to WA).

5.1.14. Guidance on the licensing system has been issued by the JC & CC for these recovery groups and has recently been revised (Service Personnel and Veterans Agency 2007). Conditions may be attached to the granting of a licence and a report giving details of items recovered is normally required. The conditions can require the presence of an MoD representative during recovery operations. However, the licence application form does not require the potential licensee to state a reason for undertaking the work proposed. **Appendix VI** contains a copy of the relevant guidance.

5.1.15. Prosecutions for breaches of the requirements of the PMRA are rare. Information concerning illegal activity is passed by JC&CC to the MOD Police for action to be taken. A prosecution was undertaken in 2002 for the illegal excavation of a Hawker Tempest and this resulted in the offender receiving a 12 month suspended sentence. In 1996 a member of the public was cautioned in relation to the illegal excavation of a Spitfire in Kent (JC&CC, letter to WA). It is not clear what proportion of illegal activity is detected.

5.1.16. Information on licence applications can be obtained by means of a Freedom of Information Act enquiry, although personal details will not be given.

5.1.17. JC&CC liase with CNS Heritage based at Portsmouth, who are also responsible for the application of the PMRA and with HM Receiver of Wreck (JC&CC, letter to WA).

5.1.18. The remains of crashed aircraft can be disturbed accidentally, for example by farmers who were unaware of their presence. In the marine context this may occur in relation to marine aggregate dredging. It is technically an offence under the PMRA for such remains to be further moved or tampered with except under licence. WA understands that no such prosecution has been mounted in relation to a crash site at sea.

5.1.19. No similar statute applies to civilian aircraft not under military service. Access to a civilian aircraft crash site can theoretically be controlled by the owner but would require civil proceedings to be mounted or at least threatened and this can only be done in very limited circumstances.

5.1.20. It should be noted that the powers of port authorities in relation to safe navigation, etc. can take precedence over the PMRA and other heritage related legislation. For example the Port of London Authority has the power to clear a military aircraft wreck from the seabed without licence if it is conflicting with the Authority's duty to provide safe navigation within its jurisdiction.

Salvage

5.1.21. Aircraft remains, and items of personal property associated with them recovered from UK territorial waters are subject to the Merchant Shipping Act 1995. Therefore anything recovered must be reported to the Receiver of Wreck (RoW) through the

droit system. The finder is normally entitled to a salvage award provided that they have acted lawfully and the item recovered may be gifted in lieu.

5.1.22. In addition to deliberate recoveries, this also applies to accidental recoveries, for example military aircraft wreckage that is recovered as a result of trawling or aggregate dredging. In the case of the former, the RoW notifies the JC&CC that a recovery has been made. The MoD normally gifts the recovery to the finder in lieu of salvage.

Marine aggregate dredging and other marine development

5.1.23. Marine aggregate dredging in UK waters is covered by the BMAPA and EH document *Marine Aggregate Dredging and the Historic Environment: Guidance Note* (BMAPA/EH 2003). This document sets out the character and importance of the marine historic environment and describes best practice in dealing with the historic environment in the course of planning marine aggregate dredging. It includes details of mitigation measures, including the implementation of protocols to report and deal with finds made in the course of dredging.

5.1.24. Protocols for reporting archaeological finds emerged as a mitigation option as it became apparent that watching briefs by archaeologists, either on board dredgers or on the wharves, were unlikely to prove effective because of the scale and character of the dredging process. The Protocol subsequently adopted is therefore intended to provide a substitute archaeological 'safety net. The Protocols have been adopted by all BMAPA members and the associated Implementation Service has been running since September 2005 (WA 2006b and 2007e) with a notable year on year increase in the numbers of reports as industry personnel beome more familiar with its use.

5.1.25. Research work has been undertaken in relation to assessing the importance of shipwrecks in areas impacted by marine aggregate dredging (WA 2006e and Bournemouth University 2007b). No similar work has been undertaken in respect of aircraft crash sites.

5.1.26. *Historic Environment Guidance for the Offshore Renewable Energy Sector* (WA, 2007b) provides generic guidance on the survey, appraisal and monitoring of the historic environment during the development of offshore renewable energy projects in the UK. Aircraft crash sites are included, but are not considered separately to other maritime sites such as shipwrecks.

5.1.27. Regional environmental assessments are currently being carried out on behalf of aggregate industry consortia, for example the Thames Estuary Dredging Association (TEDA). These will consider archaeology and aircraft will form part of that archaeological assessment.

5.1.28. Furthermore *Marine Mineral Guidance 2* (DEFRA 2007) provides recommended examples of model conditions for dredging permissions. These include conditions concerning archaeology, war graves and wrecks. These reference and therefore effectively adopt the Protocol but do not specifically mention aircraft.

Archaeological guidance

5.1.29. *Military Aircraft Crash Sites: Archaeological guidance on their significance and future management* (EH 2002) provides archaeological and heritage management guidance on military aircraft crash sites.

5.1.30. EH guidance on military aircraft crash sites states that there should be a presumption that nationally important aircraft crash sites (see below) should be preserved *in situ*. However, for the majority of less important sites and possibly for some nationally important sites, the position adopted is that excavation and recording is the appropriate response, provided that appropriate fieldwork and recording methodology is adopted and a record of the excavation is lodged with the local SMR and the NMR (EH 2002: 7).

5.1.31. The Institute of Archaeologists (IFA), the professional representative body for archaeologists in the UK, publishes a number of relevant guidance notes, setting out standards for various types of relevant archaeological work, including desk-based assessment (IFA 2001).

Planning

5.1.32. Planning law only applies within the territory of local authorities which, as a general rule, extends only to the low water mark. However, English Heritage and RCHME included the following statement in England's Coastal Heritage (see below):

5.1.33. Although it remains government policy not to extend the Town and Country Planning system to the territorial sea, the principles set out in Planning Policy Guidance Note 16: Archaeology and Planning should be applied to the treatment of sub-tidal archaeological remains in order to secure best practice.

5.1.34. Additionally, Marine Minerals Guidance Note 1 (MMG1); Guidance on the Extraction by Dredging of Sand, Gravel and Other Minerals from the English Seabed (2002) notes that the JNAPC Code of Practice for Seabed Developers recommends procedures for consultation and co-operation between seabed developers and archaeologists. This is consistent with the Government's policy on archaeology as stated in PPG16, and should continue to be followed by the dredging industry.

5.1.35. *Planning Policy Guidance: Archaeology and Planning* (PPG 16 1990) sets out the Secretary of State's policy on archaeological remains. It acknowledges the potentially fragile and finite or irreplaceable nature of such remains (Para. 6), and states that the desirability of preservation of archaeological remains and their setting is a material consideration within the planning process (Para. 18). PPG 16 provides that there is a presumption in favour of the physical preservation of nationally important archaeological remains (Para. 8), and that where preservation *in situ* is not justified it is reasonable for planning authorities to require the developer to make appropriate and satisfactory provision for excavation and recording of remains (Para. 25).

5.1.36. Paragraph 19 of PPG 16 suggests that it is in developers' own interests to include an initial assessment of whether the site is known or likely to contain archaeological remains as part of their research into the development potential of a site. Paragraph 22 adds: 'Local planning authorities can expect developers to provide the results of such assessments ... as part of their application for sites where there is good reason to believe there are remains of archaeological importance'. PPG 16 also notes that in spite of the best pre-planning application research, there may be occasions when the presence of archaeological remains only becomes apparent once development has commenced (Para. 31).

5.1.37. *Planning Policy Guidance 20: Coastal Planning* (PPG 20) sets out the importance of the coast as a national resource. Paragraph 2.8 states that the coastal zone also has a rich heritage both above and below the low water mark. This includes buildings and areas of architectural or historic interest, industrial archaeology,

scheduled and other ancient monuments and other archaeological sites. As a consequence, it is recommended that policies should encourage conserving and restoring structures of special historic, architectural or archaeological interest (para. 3.6).

5.1.38. *England's Coastal Heritage: a statement on the management of coastal archaeology* was published in 1996 by English Heritage and the Royal Commission on the Historical Monuments of England (RCHME). The statement set out a number of principles for managing coastal archaeology:

- The coastal zone of England includes a finite, irreplaceable, and, in many cases, highly fragile archaeological resource which by virtue of its value, variety, and vulnerability justifies a presumption in favour of the physical preservation *in situ* of the most important sites, buildings, and remains.
- Although archaeological remains situated within inter-tidal and sub-tidal areas may be less visible and accessible than remains on dry land, this does not affect their relative importance and they should be managed in accordance with the principles which apply to terrestrial archaeological remains.
- As historic landscapes can extend seamlessly from dry land, through the inter-tidal zone, and into sub-tidal areas, effective management of the coastal archaeological resource cannot be achieved without due consideration of marine as well as terrestrial archaeological remains.

5.1.39. The statement also included a number of detailed recommendations, which include the following:

Development control and environmental assessment	Coastal archaeological interests should be adequately reflected in structure and local plans, and consistently and comprehensively included in Environmental Assessment procedures for coastal and marine developments (including harbour works, mineral extraction, oil and gas related projects, capital dredging projects, cable projects, and waste water treatment and disposal) and other activities requiring sectoral consent.
Minerals	Pending the outcome of the review of marine minerals licensing procedures, adequate consultation procedures for archaeological interests during the granting or renewal of licences should be promoted and, where appropriate, local authorities should consider the use of their powers under Section 18 of the Coastal Protection Act 1949 to prohibit or licence extraction of aggregate from the foreshore and seabed in order to secure the preservation of important archaeological remains.

Human remains

5.1.40. A licence under the PMRA will not normally be issued in the first instance if human remains are known or suspected to be present (but see 5.1.12). If human remains are discovered by chance all authorisations granted by the licence are suspended and the licensee must report the discovery to the MoD immediately without disturbing the remains further. In those circumstances it is a condition of licences that recovery activities must be suspended until the MoD gives permission to proceed.

5.1.41. The discovery of human remains must also be reported without delay to the local police and coroner (the latter is usually informed by the former).

5.1.42. US authorites take the identification and possible repatriation of human remains associated with their crashed aircraft very seriously even where they have abandoned ownership rights to the aircraft. The presence of human remains should be reported to JC & CC who will liase with the US authorities, principally the Joint Personnel Accounting Command (JPAC) who have responsibility for identifying missing US service personnel.

Unexploded ordnance

5.1.43. Unexploded ordnance must be reported to the police by the discoverer. Licence conditions for Protected Places are automatically suspended on the discovery of unexploded ordnance or pyrotechnics until such time as an MoD officer has confirmed that work can recommence.

5.1.44. An aggregate industry guidance document has been published through BMAPA which sets out the legal and operational requirements in the event that ordnance is encountered (BMAPA *et al* 2006).

Firearms, ammunition, explosives and other hazards

5.1.45. The possession of firearms, ammunition or explosives is subject to strict control under the Firearms Act 1968 (as amended) and the Explosives Act 1875. Unauthorised possession is a criminal offence and the finding of these items must be notified immediately to the police. They must be surrendered to the police on demand.

5.1.46. This type of material is normally only likely to be found on military aircraft crash sites and as such will be Crown or US Government property. In the case of Crown property, title to these items (as well as unexploded ordnance and pyrotechnics) is not normally relinquished without Home Office authority.

5.1.47. Material has been used in the construction of aircraft in the past that has only recently been found to be hazardous. For example radium based luminous paints used on many aircraft instruments are now thought to pose a significant radiation hazard (EH 2002: 6).

Other

5.1.48. The MoD operates a compensation scheme for damage caused to fishing gear through accidental collisions with military property on the seabed, including aircraft wrecks. Claims are made through the Marine and Fisheries Agency and are investigated by the Royal Navy. Further details of this scheme are given in 3.5.70-71.

5.2. ROLES, INTERESTS AND VIEWS OF EXISTING AUTHORITIES AND STAKEHOLDERS

English Heritage

5.2.1. The National Heritage Act (2002) enabled EH to assume responsibilities for maritime achaeology in English territorial waters, modifying the agency's functions to include securing the preservation of ancient monuments in, on, or under the seabed, and promoting the public's enjoyment of, and advancing their knowledge of ancient monuments, in, on, or under seabed. The role of EH is fulfilled by their Maritime Team.

5.2.2. As discussed above, EH has produced guidance on military aircraft crash sites. This guidance was produced as a result of work undertaken for the MPP rather than the Marine Team. No separate guidance exists with regard to maritime crash sites.

5.2.3. The NMR is responsible for the development and management of the national historic environment databases of buildings and sites in England and its territorial waters (the 'Heritage Data Sets'). The collation of information about aircraft crash sites and aircraft losses occurring in UK territorial waters therefore falls within their remit.

UK Ministry of Defence

5.2.4. The MoD administers responsibility for military aircraft crash sites on behalf of the Crown. One of the responsibilities exercised is the control of access to Protected Places through the licensing system. Administration of the licensing system is dealt with by the JC&CC based in RAF Innsworth at Gloucester. The JC&CC also undertake responsibility for tracing and notifying next of kin in the event that human remains are discovered in Protected Places.

UK Police

5.2.5. The UK police can be expected to be involved in so far as their legal obligations in respect of human remains, unexploded ordnance, firearms and controlled substances extend. They may also be involved in investigating criminal offences, such as activities in breach of certain provisions of the PMRA.

BMAPA and commercial marine industries

5.2.6. The following statement sets out the position of BMAPA with regard to aircraft crash sites at sea (Mark Russell, Director, Marine Aggregates, BMAPA e-mail):

"The marine aggregate industry, through its trade association the British Marine Aggregate Producers Association (BMAPA), has been proactive in developing guidance and protocols for identifying, managing and mitigating a wider range of heritage issues associated with marine aggregate extraction operations. In every case this has been in conjunction with independent marine archaeological advice (Wessex Archaeology) and input from the national advisor to British government on marine archaeological issues (English Heritage).

The marine aggregate sector recognise that their operations have the potential to interact with features of marine archaeological interest, and the existing guidance provided in the finds reporting protocol already sets out a procedure for responding to the discovery of any significant finds during production operations, including the establishment of archaeological exclusion zones. However, given the legal protection afforded to aircraft remains, the difficulty in proactively identifying sites prior to commencing dredging operations and the potential for remains to be scattered over a wide geographical area as distinct from a coherent site, the industry believe that there is great benefit in refining the specific guidance for addressing discovery of these features.

As well as the moral responsibility to respond appropriately to the discovery of previously unknown aircraft remains, marine aggregate operators will want to proactively avoid areas where remains are known to be present in order to avoid damage to dredging equipment or contamination of cargoes by metal and ordnance. Therefore, the development of a pragmatic approach to address such finds which is able to draw on the practical considerations of both the environment and the information that is available would be most welcome. Once developed, this guidance

would provide regulators, operators and archaeological experts with a clear, agreed approach to respond to future finds in an appropriate and consistent manner."

US Government

5.2.7. The US Government can be expected to be involved to the limit of its established legal and ownership responsibilities as discussed above. The US Government is actively interested in any human remains issues relating to US aircraft or US personnel and nationals even where its ownership of the aircraft would not normally be asserted. JPAC is task with accounting for all missing US services personnel. It will expect to be consulted. Contact will typically be made through JC&CC to the US authorities but informal links exist between JPAC and the Implementation Service.

German Government

5.2.8. The German Government can be expected to be involved to the limit of its established legal and ownership responsibilities as discussed above. Contact is currently undertaken through the German Embassy by JC&CC.

5.2.9. The German Governement is likely to take a similar but less active view on the issue of human remains than the US Government.

UK Receiver of Wreck (RoW)

5.2.10. The RoW can be expected to be involved to the limit of the Receiver's legal responsibilities as discussed above and will expect all recoveries from UK territorial waters to be reported. In addition experience has demonstrated that where possible the Receiver takes an interest in disseminating information of archaeological or other heritage interest. Droit information is generally made available to bona fide enquirers.

SMRs/HERs

5.2.11. HERs and SMRs are local authority-based services that collate information concerning historic monuments within the area of the relevant local authority. They are used for planning, public information and education. As such aircraft crash sites and losses fall within their remit.

5.2.12. SMRs and HERs officers consulted indicated that they would welcome further information concerning aircraft crash sites, both maritime and terrestrial. Most appeared aware that the historic record for their area of responsibility was probably unrepresentative of the number of aircraft losses that had occurred.

Association of Local Government Archaeological Officers (ALGAO)

5.2.13. The following response has been received from the Maritime Committee of ALGAO. It should be noted that the timescale of the project has meant that the response is informal and in note form and has been made at short notice. It therefore does not necessarily represent the full views of the Committee (Sarah-Jane Farr e-mail):

"Thank you for seeking views from Maritime Committee of ALGAO UK with regard to the significance and management of marine aircraft crash sites. We noted you were happy to receive comments with regard to terrestrial sites and we feel that a future wider consultation on terrestrial crash sites would be most welcome and relevant to many ALGAO members.

The following response is best view in the context of limited timescale pre-Christmas alongside most local authority Archaeological Officers' genuine lack of experience in marine crash sites.

We welcome the ALSF project whose objectives suggest that results will form a useful baseline state of knowledge. Please accept the following comments gathered by ALGAO Maritime:

Be useful to have more info on what happens to an aircraft when it hits the water and sinks to the seabed. Presumably extensive survival is unlikely. Which pieces are most likely to survive (engine block, etc)?

What are the primary sources of information exists on crash sites (military and civil) and how do we access it? Ideally we would like the results of any study to be entered into the relevant Historic Environment Record in an agreed usable format.

The exploration of marine crash sites is largely the work of sports divers? They must have significant amounts of information.

One respondent noted that they have identified crash sites from publications. Also experienced finding a site during an assessment prior to pipe laying. In this instance, the local authority advisor was instructed that it shouldn't receive any publicity, and consequently it wasn't even added to the SMR.

Locating marine crash sites: difficulty locating accurately as the contemporary reports on the losses do not usually provide sufficient information on the location of the crash site. For example, the log book of a lifeboat will sometimes record the position where downed crew were recovered but this could be several miles or more away from the crash site depending on the wind and tide and the length of time.

Terrestrial specific responses: In 2005, the MoD licences began to ask for the HER to be involved as a condition of granting the licence. One respondent cited success in ensuring that the site excavators submit a project design before starting work that I hope helps them identify the key pieces of information that are useful to the HER. It also makes it more likely that reports come into the HER. It is still early days but in some areas local aircraft wreck groups are liaising with ALGAO members and building up experience and awareness of the archaeological process we require.

One issue that may arise with terrestrial sites is a potential conflict between planning law and the Protection of Military Remains Act. It is an offence to excavate without an MoD licence under the terms of the Protection of Military Remains Act but if planning permission has been granted (even subject to condition) on a site where a military aircraft is subsequently discovered and the MoD decide not to grant a licence, because of the probability of human remains being present, then it would be illegal for the development to go ahead. Were this situation to arise there would perhaps have to be a test case to determine whether compensation were payable and by whom."

5.2.14. Local government archaeology officers between North East Lincolnshire and Dorset were consulted with regard to the study. They were asked to comment on their role with regard to the management and study of crash sites and to give a view on the perceived importance of such sites.

5.2.15. Gordon le Pard of Dorset County Council provided the following rough written notes in response:

"Aircraft remains underwater are as important on dry land, whose importance has been outlined in the EH publication though I would apply this to civilian aircraft as well.

In addition remains underwater are additionally important for two reasons;

They have not been subject to as much salvage, contemporary and recent, as terrestrial crash sites.

Preservation can be much better than on terrestrial sites. Aircraft can be relatively undamaged on crashing, then sink. Even if the aircraft crashes violently, conditions underwater can preserve the remains in better condition than a similar crash on land.

Case studies

I have been involved in three aircraft investigation, all with positive outcomes.

- Tomahawk wreck. I was only an observer at the latter part of this investigation, but it shows what an avocational group can do. The wreck was discovered by chance off the Dorset coast. Aware of their legal responsibilities the dive team did not attempt to lift any part of the wreck, but examined it closely, and discovering a part number on one of the wheels. This enabled the aircrafts identity and history to be determined. The aircraft proved to be a mark 1 Tomahawk, which had been intended for the French air force. On the fall of France it had been transferred to the RAF. It was in service with the Royal Canadian Air force when it crashed in 1941. The pilot had survived, so there was no possibility of human remains being on the wreck site. The dive team photographed the wreck but took no further action at this time. Subsequently they were approached by a team restoring a mark 1 tomahawk. The mark 1 had been an unsuccessful fighter and had been substantially redesigned. This had led to a completely different cockpit layout. Plans of the cockpit had not survived and the layout of the instrument panel was unknown. With permission from the RAF the team returned to the wreck and recovered the instrument panel. This not only solved the initial question but also explained why the aircraft had been given to the RCAF, as it had been intended for the French air force the instruments were in French, many Canadians are bilingual unlike their English counterparts. The remains were then conserved and given to the local museum where they are on permanent display.
- Pembroke Dock Sunderland. This flying boat was discovered as a result of a survey by Pembroke Dock authority prior to maintenance dredging on their main channel. It lies just to one side of the channel, but is not in an area to be dredged. The wreck attracted the attention of the local museum, which has an extensive archive collection relating to the WW2 use of Pembroke Dock as a flying boat base. I was involved with a television programme ‘The Wreck detectives’ which was filmed on the wreck. The wreck proved to be exceptionally well preserved, having been swamped in a storm and then part buried in soft silt. One propeller had been pulled off, probably by fishing gear, and lay a short distance from the main wreck. This was lifted by the television company for the programme, and then conserved by the Pembroke Dock museum. The publicity alerted the harbour authority to the importance of the wreck, which used their by-law powers to protect the wreck site. This is easy for them to do, as the site lies beside the main channel, used daily for the Irish ferries. No dive boat could approach the site without being registered by them.
- Fleet Hurricane. The details of this case are given in the attached document. Fortunately the Fleet lagoon is privately owned, and managed as a nature

reserve. In this case the estate manager read my comments and refused permission, had the site been at sea is it possible that could have been allowed.

The above stories, all illustrate the potential problems associated with underwater aircraft wrecks. Without well informed and caring divers, or sympathetic landowners or harbour authorities all these cases could have turned out very differently."

5.2.16. Although other local government archaeologists expressed interest and in one case specialist knowledge, their active involvement with aviation archaeology or crash site management was either very limited or non-existent. However, only one expressed the view that crash sites would not be regarded as a priority and therefore this difference between Mr Le Pard and the others may simply reflect his unusual and specialist maritime responsibilities

UK museums and collections

5.2.17. In addition to the major national museums, such as the RAF Museum, Imperial War Museum (Duxford), the Science Museum and the FAAM, UK aviation collections are held by a wide variety of museums and collections. Most appear to specialise in aviation, either exclusively or with a historic airfield. Many are fairly small in scale and may be associated with airfield associations or aircraft recovery or restoration groups. By no means all have professional staff and many rely upon the work of volunteers. A significant proportion are not registered under the Museums Libraries and Archives Partnership Museum Accreditation Scheme. Some hold aviation artefacts recovered from marine contexts.

5.2.18. The following response has been received to enquiries made of the RAF Museum (Andrew Simpson, Curator Department of Aircraft and Exhibits e-mail):

"The RAF Museum does not actively pursue the recovery of sea wrecks. Those from around the UK coast tend to be in shallow water and therefore heavily corroded and damaged by tidal action if lying just offshore, and would therefore unlikely to be of use or interest to the RAF Museum, as they would probably be undisplayable as recovered and would need much expenditure of scarce resources to make them usable/displayable.

We once apparently tried to treat a number of sea recovery Rolls Royce Merlin aircraft engines, but apart from a few internal parts – valves and springs – they were too heavily corroded to be of any use. We also examined a Short Stirling on the beach in Lincolnshire, but it was too far gone for recovery, although we do have a Stirling undercarriage unit recovered from a similar site, which as been loaned to a restoration group, largely to serve as a pattern for them to recreate a similar unit from crash –site recovered parts (including high –ground crash site items)

We do have on display the forward section of a Battle of Britain Hawker Hurricane recovered from a beach in the south-east – it had survived well as it was completely buried in the sand, away from corrosive tidal action or damage from fishing or dredging. A similar example of such a recovery was from a Welsh beach a couple of years ago when a private group recovered a similarly buried forward fuselage of a Vickers Wellington bomber, and are now actively seeking parts from other on-land buried crash sites to aid its restoration.

Here at Hendon we have a complete Handley Page Halifax bomber (conserved 'as found') and half of a Gloster Gladiator, both recovered from Norwegian Lakes/Fjords, whose location at the bottom of fresh-water features ensured survival in reasonable condition, though corrosion is still extensive and restoration would

result in extensive replacement and loss of original parts. The Canadians have recently completely restored another Halifax recovered from a similar location, again using parts from terrestrial crash sites in a composite restoration.

We do have in store a few severely corroded propeller units and engines acquired off fisherman's quaysides many years ago after landing by trawlers, but we are most unlikely to seek any further examples due to their condition and the time and expense likely to be necessary to restore them.

The Hellenic Air Force Museum has had some success recently in recovering a complete Vickers Wellington wing, and a complete German JU52 transport, from waters off Greece, where local conditions have permitted their survival; these will, I understand, be conserved rather than restored."

5.2.19. Similar views with regard to aircraft artefacts recovered from the sea have been expressed by the FAAM, the other major UK collection to provide a detailed response with regard to the study. Indeed the view expressed by the FAAM during discussions was that they saw little benefit to themselves as an aviation collection coming from the study of seabed crash sites, unless an important naval aircraft not currently in their collection was discovered in a good state of preservation. Generally speaking they do not seek or welcome donations of material recovered from a marine context due to their generally poor condition and the considerable ongoing conservation liabilities associated with them. They are slightly concerned that they will come under pressure to advise on or accept material recovered from the sea if the public profile of seabed crash sites increases.

5.2.20. A number of other aviation collections responded to requests for information about aircraft crash sites at sea and their potential significance. The response of North Weald Airfield Museum Association is probably not untypical (Bryn Elliott e-mail):

"In general North Weald Airfield Museum does not have a written policy in relation to aircraft lost at sea and whilst it would not refuse items such as wreckage brought to it from that source that were proven to have a direct connection with North Weald it is unlikely ever to have an interest in such items.

There are a number of aircraft types that spring to mind as being of a unique nature in air archaeology and still missing from museum collections. These might include such as the Short Stirling and AW Whitley bombers. Looking at the history of North Weald and its environs I can think of none that would relate directly to our collecting area."

5.2.21. A number of aviation collections known to have collections of aviation artefacts recovered from the sea, for example the Norfolk and Suffolk Aviation Museum and Tangmere Military Aviation Museum have been contacted for information but have not yet responded.

5.2.22. UK aviation museums and collections that have responded to requests for information are generally very supportive of the aims of the project. Generally they are interested in receiving more information about aircraft losses at sea within their collecting areas or areas of research interest. The focus of the major national institutions appears to be largely object based, whereas regional museums and collections appear to have a tendency towards a more geographically based interest.

5.2.23. Some concern is apparent, particularly amongst the large national museums, about a significant rise in artefact recovery from the marine contexts due to resource implications. Some difficulty can therefore be expected in persuading accredited museums to accept and accession artefacts from seabed crash sites. Such institutions are likely to be either highly selective or to exlude such artefacts entirely from their collecting policy. Unaccredited museums and collections may be more willing and possibly less selective, although this will again depend upon their collecting policy. There will inevitably be a risk that material may be accepted that cannot be cared for or documented adequately.

British Aviation Archaeology Council and UK aviation archaeology and aircraft recovery groups

5.2.24. The British Aviation Archaeology Council (BAAC) is a UK based representative body for aviation archaeologists and recovery groups. It appears to have a fairly wide membership amongst aircraft collections/museums and recovery groups. The BAAC appears to be supportive of the aims of the project.

5.2.25. The views of the British Aviation Preservation Council (BAPC) have been sought and are awaited. Formed in 1967, BAPC is the national body for the preservation of aviation related items. It is a voluntary staffed body which undertakes a representation, co-ordination and enabling role.

US museums and aviation historians/archaeologists

5.2.26. Contact with US based museums and archaeologists/historians has demonstrated that there is considerable potential interest in US crash sites in UK territorial waters. Expertise and practical experience exists in relation to the study of aircraft crash sites, particularly in relation to site formation and conservation issues, which could usefully be transferred to UK sites.

5.2.27. Erwin Roemer, RPA, Air Force Materiel Command has suggested that communication/reporting protocol between the UK and USA could be improved (e-mail).

German museums and aviation historians/archaeologists

5.2.28. Although WA are not aware of any existing direct German involvement in aviation archaeology fieldwork in UK waters, it is apparent from contacts made with German museums and archaeologists that the potential interest is considerable. It is clear from those contacts that the willingness (if not the resources) to contribute expertise, information and perhaps practical help exists.

5.2.29. German museums and archaeologists specialising in aviation archaeology clearly believe that there is potential for crash sites in UK waters to contribute significantly to the study of German aviation and military history. By way of illustration, the following paraphrased comments were recorded during a telephone conversation with Dr Guenter Leonhardt, director of the Luftfahrt-Museum Laatzen-Hannover. Dr Leonhardt appears enthusiastic to develop co-operative research programs with British archaeologists but appears to be unable to provide information without this being in place:

"The museum contains 24 wrecks salvaged from the water; most of them have been restored. German museums will be very interested in co-operating since other than in the United States, Great Britain, and France, many airplane types etc. are missing from German museums and museums abroad do not seem to be very helpful in providing German museums with missing parts or missing planes.

The German government claims ownership of military remains abroad, but otherwise does not seem to be all that interested in salvaging planes.

Dr.Leonhardt guesses that there are around 1,000 planes off Britain, with 800 being from the Battle of Britain. The majority of these planes should be in the Channel. After 60 years in the saltwater, any metals will probably only be paperthin, but it is still possible to find intact planes. Dr. Leonhardt mentioned that quite a number of important planes with famous pilots were shot down which haven't been recovered yet. He has all the necessary information about this.

The museum in Laatzen has a very comprehensive library with all necessary documents concerning aircraft crash sites, and most German experts in this field, according to Dr. Leonhardt, seem to be based at the museum or connected to the museum. Dr.Leonhardt himself has worked on this subject for several decades."

The Commonwealth War Graves Commission (CWGC) & veterans organisations

5.2.30. The CWGC is a non-profit making organisation that pays tribute to the 1,700,000 men and women of the Commonwealth forces who died in the two world wars of the 20th century. The Air Forces Memorial at Runnymede commemorates by name over 20,000 airmen who were lost in the Second World War during operations from bases in the United Kingdom and North and Western Europe, and who have no known graves. A significant proportion are believed to have been lost offshore.

5.2.31. The CWGC maintains a searchable database of casualties.

5.2.32. Various veterans organisations exist. For the RAF, these can be accessed through the Royal Air Forces Register of Associations (RAFRA).

5.2.33. Neither the CWGC nor veterans organisations have a formal role in licensing processes relating to military crash sites. Nevertheless their views may be considered.

5.2.34. Only very limited contact has been made with RAF (through RAFRA) and USAF veterans organisations and with the CWGC. Such organisations are likely to regard themselves as natural stakeholders in relation to aircraft crash sites on the seabed, particularly in relation to sites where human remains are likely to be present and they will undoubtedly wish to be consulted in relation to any major policy decisions affecting such sites.

5.2.35. Although such organisations and individuals can be expected to be interested in the study of aircraft crash sites, there are likely to be sensitivities concerning loss of life that will have an impact upon the their study.

Recreational divers and diving service providers

5.2.36. Grahame Knotte a Weymouth based recreational diving operator (http://www.weymouthoffshore.com/) responded to a press release concerning the project as follows. Mr Knotte stressed that his dives on aircraft sites mentioned were not intrusive (Grahame Knotte e-mail):

"Read your piece in the PBA mag and thought you may be interested in what we know and what we have in the pipeline. There are many aircraft wrecks around Weymouth and Portland. Sadly they are not of much interest to a boat load of divers as the sites are usually very decayed, small and spread out. The fact is you really need to have an understanding of what you are looking at. We haven't bothered with

many of these sites since the eighties however quite a few survive. I was approached recently and asked if I would be interested in looking for a military jet that crashed in the sixties (we have sidescan and Geodas seabed mapping) it was then that I realised how much closure meant for the person in question as the plane disappeared without trace on exercise hence we have virtually no chance of finding it unless we can obtain more info from the MOD. I got to thinking that many of these sites would probably be identifiable from serial numbers etc and have spent sometime researching engine types etc. My intention is with a few like minded folk to relocate and revisit some of these sites and also have a look for some of the well documented ones working on eye witness reports etc. I expect you are familiar with the Dorset air crash site website just makes you realise how many there are. Off the top of my head locally I can think of two in Weymouth bay (one of which I have enclosed some pictures taken last year) one south of Lulworth banks an Me109 on the Adamant Shoal a Heinkel about five miles south of the bill a Buccaneer in Lyme Bay and another German bomber near the wreck of the Scaldis which probably caused her to founder after snagging her nets. Most of the diving we do now is for the purpose of wreck research much of it is very deep and my reasons for finding these aircraft is to promote our capabilities and hopefully provide some comfort to living relatives."

5.2.37. A number of other charter boat and dive centre operators responded positively to requests for information and towards the aims of the project. Although the sample is small it does appear that the primary commercial interest lies in providing interesting dive experiences for their clients. Sites likely to provide this type of experience are likely to be well preserved and therefore fairly rare. There appears to be an appreciation that such sites are likely to be vulnerable to impacts from recreational diving.

5.2.38. Recreational divers responded to requests for information. As a proportion of the total number of requests this number was small, although the responses were positive and expressed considerable interest in aircraft crash sites. The impression gained was that more experienced divers with a long term interest were responding, rather than the average diver. Photographs, other information and opinion was provided. Little positional information was provided by the respondents. Some recreational divers appear to have recovered artefacts from crash sites. Considerable interest in identifying crash sites and in tracing vererans and relatives was apparent.

5.2.39. The interest is present amongst recreational divers but considerable further and more focussed outreach work will probably be required in order to fully exploit the information that they hold. Such information is likely to be forthcoming only if divers are satisfied that their interests are unlikely to be threatened by disclosure. Such interests are likely to revolve around issues of free access and percieved threats to sites as a result of disclosure.

5.2.40. The Nautical Archaeology Society was consulted with regard to the aims of the project. Although no formal response has been received, it is evident from limited discussions that aviation archaeology on the seabed and the enhancement of the HER using information provided by recreational divers is a potential area of interest to them.

The general public

5.2.41. As discussed above, public views have been canvassed through newspaper and magazine articles and the project blog during the course of the study. As a result of this a couple of aircraft crash sites have been reported. Otherwise no other

comment has been received. It is not therefore possible to gauge general public opinion on the value of aircraft crash sites from the evidence generated by this project.

5.2.42. High attendances at airshows and visitor figures at aviation museums and collections suggest that there is significant public interest in aviation history, both here and abroad. A recent Time Team documentary on a terrestrial crash site excavation garnered high audience figures. The continuing and obvious UK public fascination with the two world wars of the 20th century suggests that sites associated with these two events are likely to be of general public interest.

5.2.43. Furthermore aircraft crash sites are relatively recent and therefore have significance in terms of public awareness as potential war graves.

5.2.44. In recent years genealogy has become a popular public preoccupation in the UK and potential interest in crash sites from this perspective should not be underestimated.

5.3. ASSESSMENT OF IMPORTANCE AND AVIATION ARCHAEOLOGY RESEARCH

5.3.1. Aircraft crash sites are a real and tangible reminder of the the aviation history of the UK and of the momentous events of the 20th century that shaped the recent history of this and other countries. They also consitute a unique archive of rare historic aircraft and of aircraft parts. They are often associated with human remains, survivors and living relatives and can elicit considerable public interest.

5.3.2. EH policy towards assessment of significance for aircraft crash sites is set out in *Military Aircraft Crash Sites: Archaeological guidance on their significance and future management* (EH 2002). This document states that:

"English Heritage recognises the importance of sites in terms of survival, rarity or historic importance, and would wish to minimise unnecessary disturbance to examples (of aircraft crash sites) that meet a combination of the following criteria:

- The crash site includes components of an aircraft of which very few or no known complete examples survive. Examples of the commonplace may also be considered of importance where they survive well and meet one or more of the other criteria.
- The remains are well preserved, and may include key components such as engines, fuselage sections, main planes, undercarriage units and gun turrets. Those crash sites for which individual airframe identities (serial numbers) have been established will be of particular interest.
- The aircraft was associated with significant raids, campaigns or notable individuals.
- There is potential for display or interpretation as historic features within the landscape (for example as upland crash site memorials), or for restoration and display of the crashed aircraft as a rare example of its type.

In general terms, sites meeting any three of these criteria are sufficiently rare in England to be considered of national importance."

5.3.3. Distinguishing between nationally important and other sites is important because it partly determines stated EH policy towards preservation *in situ*. As noted above, EH believes that preservation *in situ* is an appropriate presumption for nationally

important sites. However, with certain caveats EH does not take the view that preservation *in situ* is the appropriate presumption for the majority of aircraft crash sites. Furthermore it states that excavation and recording may be the appropriate response for some nationally important sites notwithstanding the presumption of preservation *in situ* (EH 2002: 7).

5.3.4. A number of prominent respondents to enquiries made by WA have questioned the value of any presumption in favour of preservation *in situ* on the basis of the relevance of the surrounding seabed context to the aircraft remains themselves. These include Mark Evans of BAAC and the Director of the Fleet Air Arm Museum, Graham Mottram (both pers. comm.). Other respondents were less sceptical in this respect although concern with regard to the possible presence of human remains appeared to be a generally important factor in determining the attitude to respondents with regard to preservation *in situ*. None of the respondents specifically mentioned the EH guidance on this subject (EH 2002: 6)

5.3.5. Research for the MPP and by other researchers suggests that a significant number of aircraft types are now extinct, i.e. there are no preserved examples. For example 121 types of military aircraft in use over the UK up to 1945 were thought to be extinct in 2002 (Holyoak 2002: 661) and no examples of 64 of the 85 British and German aircraft types operating over the UK in WWI survive in preservation. Inter-war types are even rarer, with only 25% of aircraft types preserved (Holyoak 2002: 659). Schofield has compiled the following summary (Schofield et al 2004: 30):

- 1912-1918 85 types of three nationalities (British, French, German) of which examples of only 21 (24.7%) are preserved in museums
- 1919-1936 48 types of two nationalities (British and French) of which examples of only 12 (24%) are preserved
- 1937-1945 93 types of four nationalities (British, German, US and Italian) of which examples of 59 (63.4%) are preserved.

Aircraft crash sites therefore have great research potential in respect of extinct aircraft.

5.3.6. Dr Vince Holyoak has also compiled a number of tables listing military aircraft in service over the UK between 1912 and 1945 (**Appendix IX**). Dr Holyoak has attempted to characterise construction characteristics. The intention is that when combined with information on the circumstances of the loss, some indication of potential survival may be given.

5.3.7. A list of the 21 ‘extinct’ military aircraft in use over the UK in the late 1930s and early 1940s has been produced by EH (EH 2002). WA understand that this list was intended to form the basis of an informal research agenda but needs to be updated, particularly in the light of the discovery of a number of preserved aircraft in Russia in recent years (Vince Holyoak pers. comm.).

5.3.8. Furthermore many aircraft types were produced in many different forms. For example the iconic Spitfire was produced in 22 sub-variants between 1938 and 1946 and between the Marks I and V alone there were 35 major modifications (Holyoak 2002: 661 and Cotter 2001: 52). The famous German Junkers 88 was produced in 34 variants and underwent a total of 50,000 design changes (Holyoak 2002: 661 and Hastings 1999: 230). Therefore many of these variants may be extremely rare.

5.3.9. Aircraft crash sites offer the opportunity to study the many different ways that aircraft were fitted out internally. This information may not be available from existing documentation or preserved aircraft that have often undergone modification or restoration. Responses received from aviation researchers suggest that this aspect of research is considered particularly important (Mark Evans BAAC, pers. comm.).

5.3.10. *Modern Military Matters*, a document intended to provide a statement on the state of knowledge and future research priorities for 20th century military remains in Britain devotes barely a page to aircraft crash sites (Schofield et al 2004: 29-30). However, it does identify key research objectives that are relevant to aircraft crash sites (**Appendix VIII**). These constitute the effective national thematic agenda for crash sites within the overall subject of 20th century defence heritage. It should be noted that EH web-published a Revised List of Military Matters Priorities in 2006 (http://www.english-heritage.org.uk/server/show/nav.001002003008003003). Research objective C1, crash site excavation and loss of records, is marked as being underway.

5.3.11. Regional Research Frameworks are being developed in each English region as part of the Regional Research Frameworks initiative promoted by English Heritage in collaboration with local authorities. The purpose is to provide an effective yet flexible structure for decision making regarding archaeological research. Review of the latest draft version of the South West Region resource assessment and research agenda suggests that crash sites are not considered to be an important archaeological resource. Despite discussing other 20th century military sites in detail, the draft text limits itself to the following two lines on both crash sites and 20th century shipwreck archaeology (http://www.somerset.gov.uk/media/BA6/5C/SWARF_Chap10.pdf):

"Underwater archaeology is active in the South West and some aircraft crash sites have been listed."

5.3.12. It is anecdotally reported that the restoration of preserved aircraft can be assisted by the study and excavation of aircraft crash sites, most notably in the recovery of aircraft parts for pattern making or for actually fitting to an aircraft in restoration.

6. CONCLUSIONS

6.1.1. Thousands of aircraft are likely to have been lost in UK territorial and near-territorial waters during the 20th century. Most of these losses are likely to be combat losses or accidental losses of military aircraft that occurred during WWII. The potential resource is therefore very large.

6.1.2. The number of known aircraft crash sites on the seabed as recorded by the NMR and regional SMR/HERs is relatively small. The known resource is therefore relatively small. Notwithstanding issues concerning survival, the potential therefore exists for the presence of a very large number of currently unknown crash sites on the seabed and, to some extent, in the inter-tidal zone. Recent discoveries of previously unknown aircraft crash sites in licenced marine aggregate dredging areas suggests that there is a need for urgent NMR/SMR/HER enhancement in areas of seabed likely to be impacted by human activities.

6.1.3. The discrepancy between the known resource and the potential resource can be addressed by research of both primary and secondary material. However, there is a huge amount of this material and it is not complete. There is also likely to be a lack

of good quality data concerning the positions of losses. Enhancing existing databases is likely to be very time consuming and therefore can most effectively be achieved by harnessing the information and expertise of existing aviation researchers, both in the UK and abroad. Much of the work undertaken by these researchers is not geographically orientated and may require further work in this respect. In addition much of it is currently unpublished and therefore vulnerable to loss.

6.1.4. Seabed and inter-tidal environments, particularly those that result in burial or other favourable preservation environments, currently offer the potential for much more intact survival than most terrestrial sites. This can been seen in the case studies examined as part of this project. However locating well preserved sites is problematic and currently largely a matter of chance.

6.1.5. Management and research considerations are dominated by the application of the PMRA to most of the sites that constitute the resource. They are also complicated by the possible presence of human remains from what are, archaeologically speaking, recent casualties and by various international interests.

6.1.6. EH has devised a method of assessing the importance of aircraft crash sites through research conducted for the MPP. The approach suggested appears to be simple and effective, although lists of 'extinct' and otherwise important aircraft need updating. Through the same research a basic research agenda that could be applied to aircraft crash sites on the seabed has been suggested. This requires more detail and the imput of all stakeholders to ensure that it becomes a truly workable strategy. An agreed means of risk assessing known aircraft crash sites is not currently available.

6.1.7. The question of preservation *in situ* needs further consideration and consultation. In the last few years a preservation *in situ* policy has been advanced by EH in relation to archaeological sites on the seabed. However, current EH guidelines for managing aircraft crash sites do not envisage the preservation *in situ* of most aircraft remains and control of the licencing process is not directly in the hands of EH.

6.1.8. Aircraft crash sites appear to be of widespread interest to the general public and to special interests. Numerous potential stakeholders have been identified, some of whom, such as aircraft recovery groups may not have research agendas that sit entirely comfortably with current heritage management thinking. This needs to be addressed further.

7. KEY RECOMMENDATIONS

7.1.1. The project has enabled the following key recommendations to be made:

Priorities

7.1.2. Aircraft crash sites at sea should be given greater attention and priority in both research and management agendas on both national and regional levels.

Enhancement of the NMR and SMR/HER databases

7.1.3. Existing NMR and SMR/HER databases of aircraft crash sites at sea require enhancement in order to make them more comprehensive. In particular the numerical imbalance between the number of records and the number of known losses needs to be addressed.

7.1.4. They should be subject to a structured and comprehensive updating exercise/s to add details of aircraft crash sites (both terrestrial and maritime) that are known but which have not been added to the existing databases. In addition it would be desirable for all known losses for which the actual crash sites have not been located to be added to relevant database (for losses with very general locations this may mean their inclusion in more than one SMR/HER).

7.1.5. To accomplish this on a cost-effective basis, priority should be given to incorporating existing relevant unpublished research over original research.

7.1.6. The application and suitability of existing data standards should be reviewed.

Guidance

7.1.7. A more detailed and specific national research agenda for aviation archaeology should be developed. The approach taken should be flexible and would benefit from addressing and incorporating the potential interests of all stakeholders. The agenda set out in *Modern Military Matters*, together with an updated list of 'extinct' aircraft would be a suitable starting point.

7.1.8. Existing guidance for marine industries does not fully address the specific problems of aircraft crash sites. Additional archaeological and heritage management guidance specific to aircraft crash sites should therefore be prepared for all sectors of marine industry that may have an impact upon aircraft crash sites. The operation of existing guidance would benefit from the continuation of awareness raising among aggregate industry staff about aircraft finds and their potential.

7.1.9. JC&CC and BAAC should be encouraged to continue to promote and improve basic standards of archaeological recording and reporting amongst PMRA licence holders.

7.1.10. A method of risk assessing aircraft crash sites is required. The approach adopted in relation to sites designated under the Protection of Wrecks Act (1973) is recommended (EH 2007).

Further research

7.1.11. Research should be undertaken in the following areas in order to inform the above guidance and to assist in the management of aircraft crash sites:

- more specific research agendas for aviation archaeology;
- further research to identify and characterise unpublished sources of information that may be used to enhance NMR and HER/SMR datasets;
- improved methods (both desk-based and geophysical) for predicting and detecting the presence of aircraft crash sites within areas of seabed subject to human impacts;
- a framework of assessing the importance of individual aircraft crash sites, building on frameworks currently being developed for marine historic assets more generally;
- a method of risk-assessing aircraft crash sites;
- the significance of *in situ* preservation in relation to aircraft crash sites;
- site formation and preservation processes and the impact of human activities;
- the ecological significance of aircraft crash sites;

- the conservation and curation of material recovered from aircraft crash sites.

7.1.12. Aspects of the above research recommendations may benefit significantly from being carried out in co-operation with suitable avocational or international partners.

Inclusive approach

7.1.13. Community based approaches to investigating, interpreting and managing aircraft crash sites would be beneficial. As far as is compatible with good heritage management, these should be inclusive of all stakeholder interests.

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9. ARCHIVE

9.1.1. The project archive consisting of WA Access databases, digital photographs and other computer records, together with miscellaneous hardcopy documents are currently stored at WA under project code 66641.

10. GLOSSARY AND ACRONYMS NOT EXPLAINED IN THE TEXT

EOD
Explosive ordnance disposal.

SSSI
Site of Special Scientific Interest

APPENDIX I: NMR/SMR/HER AIRCRAFT SITES

Database on EH CD-ROM only.

APPENDIX II: LIST OF CONTEMPORARY SOURCES REFERRED TO IN THE REPORT

The following are in the order that they appear in the text.

Document Reference	Description	Date	Location Consulted
AIR 20/24	Records of the Air Historical Branch: Bomber policy and plans for employment of Air Striking Force	1940-1	TNA
AVIA 5	Air Ministry and successors: Civil Aviation Accident Reports and Technical Memoranda	1919-76	TNA
AVIA 5/1	Civil aviation accident reports and technical memoranda, c.1919-49: Report Nos. C1-C15	1919	TNA
AVIA 5/3	Civil aviation accident reports and technical memoranda, c.1919-49: Report Nos. C38-C48	1921	TNA
Air Ministry Form 1180	RAF Accident Record Cards	1919 onwards	RAF Museum, Hendon (microfiche)
Air Ministry Form 78	RAF Air Movement Cards	c.1930	RAF Museum, Hendon (microfiche)
AIR 27	Air Ministry and successors: Operations Record Books, Squadrons	1911-1980	TNA
AIR 50	Air Ministry: Combat Reports, Second World War	1939-45	TNA
AIR 14	Air Ministry: Bomber Command: Registered Files	1935-80	TNA
AIR 14/1620	Ditching reports and investigations: Halifax aircraft	August 1942 – March 1944	TNA
AIR 14/3466-73	`K' reports: loss of aircraft on operations	1945	TNA
AIR 14/1617	Ditching reports and investigations: Lancaster aircraft	June 1942-March 1944	TNA
AIR 20	Air Ministry, and Ministry of Defence: Papers accumulated by the Air Historical Branch	1874-1983	TNA
AIR 22	Air Ministry: Periodical Returns, Intelligence Summaries and Bulletins	1936-1963	TNA
ADM 242/7-10	War graves roll: A – C (WWI)	1914-19	TNA
AIR 10	Ministry of Defence and predecessors: Air Publications and Reports	1913-79	TNA
AIR 10/5553	Second World War 1939-1945: air-sea rescue (see references under Air Ministry)	1952	RAF Museum, Hendon
AIR 20/4320	Air/sea rescue reports: notes 1-60 (incomplete)	March 1941-October 1942	TNA
AIR 29	Air Ministry and Ministry of Defence: Operations Record Books, Miscellaneous Units: Air Sea Rescue Marine Craft Units		
AIR 29/444	No.26 Felixstowe	September 1943-August 1945	TNA
AIR 29/448	HQ AS/R MCU	1941-6	TNA
AIR 15	Air Ministry and Admiralty: RAF Coastal Command: Registered Files:		
AIR 15/595	Air-sea rescue: weekly reports	January-December 1944	TNA
AIR 15/797	Aircraft and shipping incidents: tables and charts	1949-51	TNA
AIR 15/402	Air Ministry and Admiralty: RAF Coastal Command: Registered Files: Air/Sea Rescue	December 1941-November 1943	TNA
-	FAA: Air Accident Cards, accident summaries and reviews, airframe log cards, aircraft log books	WWII and 1954-81	FAAM (Records and Research Centre)
ADM 207	Records of Air Department, Fleet Air Arm, Royal Naval Air Service and Department of Aircraft Equipment: Admiralty: Fleet Air Arm: Squadron Diaries and Standing Orders	1939-57	TNA
AIR 16	Air Ministry: Fighter Command: Registered Files	1925-88	TNA
AIR 16/690	German attacks on England 8th Aug.-10th Sept.	August-September 1940	TNA
AIR 16/166	Reports on casualties: Enemy aircraft	January 1940-January 1941	TNA

APPENDIX III: CIVIL AVIATION LOSSES AT SEA

The following is a summary of loss records held by the AAIB. It is not regarded as being a comprehensive record, particularly for the inter-war period between 1920 and 1939. The AAIB hold no records for civil aviation losses prior to 1920, although some information is available from other sources.

Date of Loss	Aircraft	Location	AAIB File Reference
25/05/1920	D H 6	IN SEA OFF DOUGLAS ISLE OF MAN	C23
03/08/1920	D H 6	IRISH SEA OFF RAMSEY	C30
03/06/1922	SPAD BERLINE	AT SEA OFF FOLKSTONE	C54
13/12/1923	SPERRY MESSENGER	OFF RYE HARBOUR	C76
17/07/1926	AVRO	MORECOMBE FORESHORE	C91
29/05/1928	AVRO 504K	WEYMOUTH BAY	EW/C119
09/03/1929	MOTH DH60X	NORTH SEA	EW/C136
17/06/1929	W10 HANDLEY PAGE	AT SEA OFF DUNGENESS	EW/C141
04/12/1932	MOTH DH60X	SOUTHAMPTON WATER	EW/C235
25/08/1934	DRAGON	ST AUBINS BAY, JERSEY	EW/C282
02/10/1934	DH89 RAPIDE, DRAGON VI	OFF FOLKESTONE	EW/C291
07/11/1934	MOTH	OFF SPITHEAD	EW/C294
03/07/1935	WESSEX IV	ENGLISH CHANNEL	EW/C314
01/02/1936	AVRO AVIAN	RIVER MERSEY, LIVERPOOL	EW/C330
31/07/1936	CLOUD	OFF JERSEY	EW/C348
24/09/1937	D H MOTH	IN SEA NR SHOREHAM HARBOUR	EW/C386
17/07/1938	HAWK TRAINER MK III	IN SEA OFF CLIFTONVILLE	EW/C406
22/11/1938	LOCKHEED 14	WALTON BAY, SOMERSET	EW/C415
02/01/1939	DH 60G MOTH	LANGSTONE HARBOUR	EW/C417
27/06/1939	GIPSY MOTH	IN SEA OFF LANCING	EW/C432
03/06/1941	DH84 DRAGON	AT SEA BETWEEN SCILLY ISLES	EW/C448
19/08/1943	MOSQUITO	IN SEA	EW/C456
16/04/1947	PROCTOR	IN SEA OFF ST JOHN SUR-MER	EW/C478
27/06/1947	AEROVAN	SE OF ROCK LIGHTHOUSE N1	EW/C484
03/07/1947	ANSON	MISSING BETWEEN JERSEY AND	EW/C493
06/01/1948	PROCTOR	IN SEA OFF MARGATE	EW/C517
11/06/1948	ANSON	IN SEA OFF ISLE OF MAN	EW/C525
06/05/1949	FREIGHTER	IN SEA OFF PORTLAND BILL	EW/C540
01/04/1951	PROCTOR III	MISSING OVER ENGLISH CHANNEL	EW/C573
09/06/1951	AERONCA	MISSING BETWEEN RONALDSWAY	EW/C580
10/07/1951	RAPIDE	MISSING BETWEEN BLACKPOOL AND IOM	EW/C581
14/06/1952	CONSUL	ENGLISH CHANNEL	EW/C595
28/01/1953	SUNDERLAND	CALSHOT ALIGHTING AREA	EW/C609
01/04/1953	MILES MESSENGER	NORTHOLT TO DUBLIN	EW/C613
04/02/1954	BRITANNIA	LITTLETON FLATS ON SEVERN	EW/C619
19/06/1954	CONVAIR 240	IN SEA OFF FOLKESTONE	EW/C621
19/06/1954	CONVAIR	IN ENGLISH CHANNEL	EW/C/186
20/08/1955	AUSTER AUTOCAR	IN SEA OFF HARTLAND POINT	EW/C639
23/10/1958	PROCTOR	IN THE ENGLISH CHANNEL	EW/C691
08/05/1959	MILES FALCON	LYME REGIS BAY, DORSET	EW/C697
10/05/1959	AUSTER 5	IN SEA 1 MILE OFF JERSEY	EW/C698
31/12/1959	AUSTER	IN NORTH SEA 15 M OFF CROMER,	EW/C702
07/02/1960	AUSTER	OFF BEACHY HEAD	EW/C706
04/03/1961	TIGER MOTH	IN SEA NR SWANAGE, DORSET	EW/C732
05/03/1961	MILES GEMINI	OFF WARDEN POINT, ISLE OF SHEPPEY	EW/C733

19/05/1961	SCAN 30 AMPHIBIAN	SOUTHAMPTON WATER	EW/C737
05/01/1965	BOLKOW KLEMM 107C	IN SEA NR LITTLEHAMPTON	EW/C/85
20/06/1965	VC10	OVER BRISTOL CHANNEL	EW/C/104
26/08/1966	PIPER PA-22	IN SEA NR ALDERNEY A/C CI	EW/C/145
14/02/1967	BRANTLEY HELICOPTER	IN SEA OFF BRIGHTLINGSEA, ESSEX	EW/C/160
25/06/1968	SRN 6 HOVERCRAFT	COLLISION COWES HARBOUR	EW/C/216
21/05/1969	HUNTER MK 9	In sea off Norfolk	EW/C154/01
12/06/1969	WESTLAND S55 Series 3	IN SEA 1/2 ml N of GT YARMOUTH	
30/08/1969	LOCKHEED AERMACCI	IN SEA 1 ML NE YARMOUTH, IOW	
04/02/1970	CESSNA 310A	IN SEA OFF ARBROATH	EW/C336/01
04/03/1970	LIGHTNING	(Ex Leuchars) IN SEA OFF MAY ISLAND	EW/D166/01
07/05/1970	LIGHTNING Mk 3	IN SEA OFF GREAT YARMOUTH	EW/D170/01
21/05/1970	MORANE SAULNIER MS 892	IN SEA 23 mls/110° JERSEY	
08/09/1970	LIGHTNING F6	EX RAF BINBROOK (Recovered from N Sea)	EW/D175/01
25/02/1971	PIIPER PA-23	NORTH SEA	EW/C371/01
24/06/1971	SCINTEX CP 301	IN SEA 4 mls S ASHFORD	
26/06/1971	HILLER UH-12E	TWO AND HALF MLS OFFSHORE BOSTON AREA	
28/08/1971	RAF WHIRLWIND	IN SEA OFF CHIVENOR	EW/D186/01
28/08/1971	PIPER CUB	Aircraft missing no trace	EW/C392/01
24/06/1972	(FOURNIER RF	(MID-AIR COLLISION OFF NEEDLES, IOW	(EW/G72/072
18/09/1972	CESSNA FRA 150L	IN SEA OFF LANGNESS POINT, IOM	EW/G72/127
11/12/1972	CESSNA F172	IN SEA 58° 33'N/01° 42' W	EW/C430/01
03/04/1973	DRUINE D31 TURBULENT	IN WATER WINCHALSEA BEACH NR RYE	EW/G73/036
04/04/1973	SIKORSKY S61	IN NORTH SEA OFF DYCE OIL RIG	EW/C/445/01
24/06/1973	CESSNA 150	OFF SWANAGE	EW/C/451/01
22/09/1973	PIPER PA-28	IN SEA HORSE IS AND BALLYDEHIOB BAY	
17/10/1974	PIPER PA-30	OFF CONNEL, OBAN	EW/C/502
04/02/1975	FUJI FA 200	IN IRISH SEA N OF WALLESEY	EW/C/510
29/05/1975	SIKORSKY S61N	SEACREST OIL RIG IN NORTH SEA	
01/08/1975	BELL 206A	NORTH SEA	
21/09/1975	MCcCULLOCK GYROCOPTER	1 ML OFF WORTHING	
24/12/1975	CESSNA	IN SEA OFF MULL	EW/C/549
04/01/1976	PIPER PA-28	IN SEA OFF ESSEX COAST	EW/C/550
07/01/1976	PIPER PA 23-250 AZTEC	50 NM OFF EASTERN ENGLISH COAST AT FL60	
25/01/1976	BEECHCRAFT 80	10 MLS OFFSHORE SUFFOLK	
12/02/1976	BOLKOW	NORTH SEA	EW/C/568
08/03/1976	WESSEX	NORTH SEA RIG	EW/C/554
21/06/1976	RALLYE 150ST	IN CHANNEL OFF CALAIS	EW/A263
20/11/1976	PIPER PA28 200-R ARROW	DITCHED APPROX 22 MLS OFF COAST OF NICE	EW/G76/159
26/02/1977	MUSKETEER	3 MLS OFF BOULMER	EW/G77/02/9
12/09/1977	BELL 212	BRENT SPAR OIL RIG, NORTH SEA	EW/G77/09
01/10/1977	SIKORSKY S61	N SEA OFF ABERDEE	EW/C/606
05/02/1978	PIPER PA 30	OM SEA PFF BROUGHTY FERRY	EW/C814
17/02/1978	SIKORSKY S58	NORTH SEA OVER RIG 36/22	EW/G78/02/15
10/04/1978	GARDAN HORIZON	IN SEA OFF PORTHCAWL	EW/G78/04/4
10/10/1978	CESSNA 152	IN SEA OFF WORTHING, SUSSEX	EW/C/641
24/10/1978	PIPER PA-23 ASTRA	MISSING OFF ST ABBS HEAD BERWICK	EW/C/643/01
24/10/1978	SK61N	BRADFORD DOLPHIN OIL RIG	EW/R68/01
22/01/1979	PARTENAVIA P68B	IN SEA OFF LYDD, KENT	EW/C/653
25/01/1979	BELL 212	N SEA OIL RIG PLATFORM "Quebec Bravo"	EW/G79/01/14
30/07/1979	FUJI FA-200 180 AO	IN SEA, NR LOOE ISLAND, CORNWALL	EW/C/671

13/08/1979	VOLMER JENSEN SPORTSMAN	IN SEA AT DORNOCH, SCOTLAND	EW/G79/08/14
31/07/1980	SIKORSKY S61N	IN SEA 25 MLS FROM ABERDEEN	EW/C710
02/08/1980	JODEL DR1050	IN SEA OFF GREAT ORMES HEAD, LLANDUDNO	EW/C711
24/09/1980	PIPER PA23-235 APACHE	IN SEA 25 MILES S OF BOURNEMOUTH	EW/G80/09/07
14/11/1980	SIKORSKY S61N	SETCO 707 OFFSHORE OIL PLATFORM	EW/G80/11/02
26/11/1980	BELL 212 JET RANGER	ARPET C OFFSHORE OIL PLATFORM	EW/R68/01
03/12/1980	PIPER PA-E23-250 AZTEC	OFF SHELLEY BEACH, EXMOUTH	EW/C724
28/12/1980	SIKORSKY S61N	SHELL CORMORANT ALPHA PLATFORM, N SEA	EW/G80/12/08
13/08/1981	WESTLAND WESSEX 60	IN SEA 8NM E OF BACKTON GAS TERMINAL	EW/C764
03/10/1981	PARTENA VIA PN 68	IN SEA S OF GUERNSEY	EW/B200/01
03/12/1981	PIPER PA24 260	IN SEA SOUTH OF BOURNEMOUTH	EW/G8112/08
21/04/1980	CESSNA 172	OFF ANVIL POINT, S OF SWANAGE	EW/C84/01
14/09/1982	BELL 212	IN SEA NORTH OF MURCHISON PLATFORM	EW/C800/01
16/09/1982	WASSMER WA 41	IN SEA 20 MLS N OF ALDERNEY	EW/G82/09
11/03/1983	SK61	IN SEA 77 MLS FROM ABERDEEN	EW/C815/01
03/04/1983	CESSNA 404	OVER NORTH SEA	EW/C820/01
04/04/1983	AS 332L TIGER	OVER NORTH SEA	EW/8/13/A
16/07/1983	SIKORSKY S61N	IN SEA NR ST MARY'S	EW/C840/01
23/10/1983	PTERODACTYLE MICROLIGHT	SANDBANK OFF MILFORD ON SEA	EW/C83/10/07
08/12/1983	CESSNA 500 CITATION	IN SEA SE OF STORNOWAY	EW/.C857/01
15/02/1984	BIO MITCHELL WING MICROLIGHT	OFF COAST NR PILLING, LANCS	EW/C863/01
11/05/1984	CESSNA F150F	OFF ISLE OF GRAIN, KENT	EW/G84/05/01
06/06/1984	PANTHER SOLARWING (MICROLIGHT)	IN SEA OFF DUNGENESS	EW/G84/06/17
16/06/1984	CESSNA 172N	IN SEA NR BOULOGNE HOVERPORT	
17/08/1984	S61N	MOBIL SEARCHER (Survey vessel)	EW/G84/08/17
26/10/1984	THUNDER COLT BALLOON	9.5 MLS OFF BELGIAN COAST	EW/G84/10
23/06/1985	BOEING 747	IN SEA OFF COAST OF IRELAND	EW/B221
17/03/1986	JODEL DR 1050	IN SEA OFF ORPHIR, ORKNEY	EW/G86/03/07
15/05/1986	BELL 214 ST	SEA OFF FRAZERBOROUGH	EW/C967
26/07/1986	GROB 109	IN SEA	EW/G86/07/15
09/12/1987	SIKORSKY S76	FULMAR RIG NORTH SEA	EW/C1051
15/04/1988	SUPER SCORPION	IN SEA OFF SCARBOROUGH	EW/G88/04
20/04/1988	PHANTOM FG2	NORTH SEA,20NM EAST LEUCHARS.	EW/D425
07/08/1988	MICROLIGHT	IN SEA BETWEEN STEEPLE & OSEA ISLAND	EW/J88
10/11/1988	SIKORSKY S61	NORTH SEA 2MILES S. CLAYMORE PLATFORM	EW/C1090
04/03/1990	REIMS CESSNA F172N	IN SEA OFF WHITEROCKS N, IRELAND	EW/G90/03
17/03/1990	CESSNA F177	IN SEA ENGLISH CHANNEL	EW/G90/03
25/07/1990	SIKORSKY S61N	BRENT SPAR PLATFORM, NORTH SEA	EW/C1172
23/11/1990	PIPER PA-28 ARROW	IN SEA 27NM FROM AILSA CRAIG, SCOTLAND	EW/C1183
24/12/1990	BELL 214ST	NR CORMORANT A PLATFORM, NORTH SEA	EW/C1195
07/07/1991	PIPER PA-22-160 TRIPACER	IN SEA OFF ISLE OF WIGHT	EW/G91/07/13
20/08/1991	SCINTEX CP301-C3 EMERAUDE	IN SEA OFF POINT OF AYRE, ISLE OF MAN	EW/G91/08/24
20/03/1992	BELL JETRANGER III	MORCAMBE BAY, IN IRISH SEA	EW/G92/03/09
18/04/1992	SIKORSKY S76A	NEAR HEATHER RIG, NORTH SEA	EW/C92/4/6
02/03/1993	PIPER PA-34-200T SENECA II	25 MILES SW BOURNEMOUTH, DORSET (OFFSHORE)	EW/G93/03/02
30/10/1994	CESSNA 175A	IRISH SEA ABOUT 15NM NORTH EAST OF ANGLESEY	EW/C94/10/3

APPENDIX IV: WEB-PUBLISHED CRASH DATABASES

Dorset Aircraft Crashes

The following list is reproduced by permission of the compiler Dave Fagan from the web site http://daveg4otu.tripod.com/dorset/dorcrash.html. Downloaded on 18 December 2007, the site should be visited for the latest version.

The database covers both terrestrial and marine losses.

The database is reproduced as an example of the extensive private research on aviation losses that is increasingly being published on the web.

DORSET CRASH LIST				
Updated 17 November 2007				
With additional information from Howard J Curtis and from "Wings over Weymouth" by Colin Pomeroy				
.				
The earliest recorded accident was				
'Around 1891' Three aviators lifted off in a balloon from Lodmoor but				
the wind changed and they started to drift towards the sea. In an				
attempt to avoid this, they operated the release valve incorrectly and				
became entangled in the spire of St. John's church on the esplanade.				
They managed to release themselves and then landed heavily on the beach .				
Moving on to the 20th century....				
Date	**Aircraft**	**Type**	**Unit**	**Fate**
28-05-07	"Thrasher"	War Department (Army) balloon dropped into Lyme Bay.		
Both crew drowned.				
12-07-10		Short-Wright Biplane Cr at		
Southbourne,Pilot,Hon C.S.Rolls killed				
24-04-16		"Biplane"	cr at Talbot Village	
1917(Summer)		Zero Airship	cr Loders en route to RNAS Toller	
22-07-18		Bristol Fighter	cr Christchurch Rd ,Bournemouth	
15-8-19	G-EAEE	Channel Mk 1	written off at Bournemouth	
10-9-19	G-EALP	Supermarine Sea Lion	cr in sea off Bournemouth	
23-6-24	N9512	Westland Walrus -	ditched in Weymouth Bay.	
29-5-26	G-EBLA	Avro 504K	cr in sea off Weymouth	
4-6-27	G-EBDO	DH.37A	Fatal crash at Ensbury Park Racecourse.	
6-6-27	G-EBPW	Westland Widgeon	cr Ensbury Park Racecourse	
6-6-27	G-EBKD	Blackburn Bluebird	cr Ensbury Park Racecourse	
19-6-28	G-EBLA	Avro 504K	crashed into Weymouth Bay after	
failing to pull out of a spin.1 killed(Pilot) passenger survived. See 29-5-26(?)				
7-8-30	G-EARZ	Avro 504K	accident at Bournemouth	
16-11-31	G-AAEN	DH60G	Crashed Blandford	
26-01-32	N255	Parnall Peto	lost when the submarine M2 sank in West Bay.	
25-6-34	G-ACCF	Fox Moth	Fox Moth G-ACCF	
failed to clear standing crops on take-off from				
Middle Farm airfield at Dorchester and crashed half a mile from Maiden				
Castle. The aircraft was extensively damaged but all on board survived.				
26-11-37	K7056	Blenheim I	H.A.D. cr at Woodsford airfield	

11-12-37	K7594	Fairey Battle	226Sq	spun in at Chesil Beach 2 crew killed
9-8-34	G-ACJD	Miles Hawk		Crash at Crichel Park Golf Course
14-1-38	K6057	Westland Wallace II	6 ATC	cr at Holworth,Owermoigne.
10-3-38	K6063	Westland Wallace II	6 ATC	cr Langton Herring
18-3-38	K5985	Swordfish I		Air Torpedo Development Unit,RAF Gosport.
	Hit trees and cr at Kingston,Corfe Castle.Pilot + 2 groundcrew pax killed.			
12-4-38	K3086	Hawker Audax	2 FTS	cr Warmwell airfield
25-5-38	K8223	Hawker Fury	9 FTS	Hit drogue and cr off Chesil Beach
10-12-38	K8271	Hawker Fury	9 FTS	Crashed into the waters of the Fleet opposite
	Fleet House after the tail struck Chesil Beach during a firing pass.			
	Pilot killed.			
10-3-39	K6063	Westland WallaceII	6ATS	force landed in a field
	between Chickerell and Langton herring and caught fire.			
	Occupants survived but the aicraft was burnt out.			
13-3-39	K4396	Hawker Audax	6 FTS	Failed to pull out of a dive and hit the
top of the beach before crashing into the sea 20 yards beyond. Pilot killed.				
12-7-39		(single seat a/c)		crashed two miles off Chesil Beach after
	it became entangled in the tow cable during an airgunnery exercise.			
	Iraqi pilot (attached to an RAF FTS) was killed.			
2-12-39	K9267	Battle 1,	CGS	cr Drimpton
2-4-40	K4654	Hind 1	10 BGS	accident at Warmwell.
2-4-40	L6982	BP Defiant I	C.G.S	cr Warmwell Airfield
3-4-40	K5544	Hawker Hind	10 BGS	cr landing at Warmwell
22-4-40	K3525	Fairey Seal	10 BGS	cr Langton Herring.Pilot Killed
22-4-40	K8173	BP Overstrand I	10 BGS	cr in sea off Chesil Beach.3 killed
22-4-40	N7551	Miles Master I	CGS	pilot baled out over Puddletown
23-4-40	L4799	Lysander	613 SQ	cr in Chickerell village.
	(Shown as L2057 in some sources-not Lysander serial)			
24-4-40	K6839	Hawker Hind	10BGS	cr landing at Warmwell
26-4-40	K5382	Hawker Hind	RAFC	hit power lines and cr near Lytchett Matravers
27-4-40	K5425	Hawker Hind	10 BGS	cr on take off 1 mile e of Warmwell
29-4-40	L3348	Henley 1	10 BGS	cr Abbotsbury area
7-5-40	K3480	Fairey Seal	10BGS	cr near Warmwell
13-6-40	P4297	Hampden 1	16 OTU	cr Iwerne Minster -
	Pilot JES MacAllister killed			
2-7-40	L6982	Defiant 1	CGS	accident Warmwell
airfield				
4-7-40	2480/B3+DM	He 111P	III/KG54	s/d by 92 SQ and cr at Longmoor Farm,
	Gillingham,3 killed.			
8-7-40		Spitfire	609Sq	shot down,cr off Swanage.
9-7-40	R6637/PR-Q	Spitfire	609Sq	shot down by Lt Egon
Mayer, I/JG 2, cr off Portland,				
9-7-40		Ju.87		cr off Portland
11-7-40	?/2N+EP	Bf.110	2S/ZG76	Forcedclanding at Povington Heath,Tyneham
11-7-40	L1069	Spitfire I	609SQ	Shot down and cr off Portland
11-7-40	L1095	Spitfire I	609SQ	Shot down and cr off Portland
11-7-40	N2485	Hurricane I	501SQ	Shot down by bf109 of 111/JG27
		and cr off Portland		
12-7-40	P3084	Hurricane I	501Sq	Shot down and cr off Portland
13-7-40	P2950	Hurricane	238Sq	Cr at Little Mayne Farm,
		West Knighton after dogfight,		pilot killed
15-7-40	L1086	Spitfire	609Sq	Crash-landed at RAF Warmwell

18-7-40		Do.17		shot down,cr at Fleet.
18-7-40	R6636	Spitfire	609Sq	Shot down by Ju 88 off Swanage,
cr Studland beach,recovered and repaired.				
20-7-40	P3766	Hurricane I	238Sq	shot down and cr Lyme Bay
20-7-40	P3082	Hurricane I	501Sq	shot down and cr Lyme Bay
20-7-40	K9880	Spitfire I	152Sq	Shot down and cr off Swanage
21-7-40	780/5F+OM	Do 17M	4(F)/14	s/d by 238 Sq and cr at Nutford Farm ,
1 mile N of Blandford				
25-7-40		Do.17		Shot down by 152 Sq Spitfires
and cr near Weymouth				
25-7-40	K9901	Spitfire I	152Sq	Shot down and cr off Portland
26-7-40	K9815	Spitfire 1	609Sq	cr Piddlehinton afetr engine failure,
destroyed by fire.				
27-7-40	N3023	Spitfire I	609Sq	Shot down and cr off Weymouth .
P/O Buchanan killed.				
8-8-40	K9894	Spitfire I	152Sq	Shot down by Me109(II/JG53)
and cr at Bestwall,nr Wareham.				
8-8-40	L1082	Spitfire I	609Sq	Forced landing at Christchurch.
8-8-40	R6811	Spitfire I	152Sq	cr landed at Spyway Farm,Langton Matravers.
(also given as "Marsh Farm,Bestwall")				
10-8-40		Hurricane	145Sq	Forced landing at Christchurch ,
damaged by Luftwaffe				
11-8-40	?/B3+DC	Ju.88	KG54	shot down by 213Sq,cr at Blacknor Fort,Portland
11-8-40	L2057	Hurricane I	601SQ	cr in sea off Portland
11-8-40	P2978	Hurricane		cr in sea off Portland
11-8-40	P3222	Hurricane I	238Sq	shot down by Bf.109,cr nr
Weymouth,pilot killed.				
11-8-40	P3585	Hurricane I	213SQ	cr landed Lulworth Camp
11-8-40	P3598	Hurricane I	87Sq	cr landed near Warmwell
11-8-40	P3783	Hurricane I	601Sq	cr in sea off Portland
11-8-40	P3885	Hurricane I	601Sq	cr in sea off Portland
11-8-40	R4092	Hurricane I	601Sq	cr in sea off Portland
11-8-40	R4094	Hurricane I		cr in sea off Dorset coast
11-8-40	R6614	Spitfire I	152Sq	cr in sea off Dorset coast
11-8-40	P3789	Hurricane I	213Sq	shot down and cr in sea off Portland.
Pilot killed.				
11-8-40		Bf.110		cr near Swanage
11-8-40		Bf.110		cr in sea near coast(where?)
11-8-40	N2650	Hurricane 1	3213Sq	cr in Portland area -
pilot R Wright killed.				
12-8-40	?/1G+AC	He111H-3	II/KG27	s/d and cr at Sturminster Marshall
12-8-40	R6692	Spitfire 1	609Sq	w/o after overstressed,Warmwell.
13-8-40	?/L1+FZ	Bf.110	LG1	cr Swalland Farm,Kimmeridge
13-8-40	P3177	Hurricane I	238Sq	cr in sea off Portland- Pilot H Marsh missing.
13-8-40	P3348	Hurricane I	213SQ	shot down and cr in sea nr Portland.
Pilot missing.				
13-8-40		Ju.87		shot down by 152SQ,cr nr Portesham
13-8-40	P3805	Hurricane I	238SQ	crash landing 1 mile E of
Burton Bradstock at Bredy Farm.Pilot OK				
13-8-40		?(Me.110 or Ju.87)		shot down ,cr nr Grimstone Viaduct,Stratton
13-8-40		Bf.109		Shot down and cr in sea off Weymouth
13-8-40	10	Bf.109	5/JG53	Shot down by 609 Sq and cr Poole Harbour
13-8-40		Bf.109		Shot down and cr in sea off Dorset coast

13-8-40	?9+??	Bf109-E1	5/JG53	s/d by 609Sq, cr in Weymouth Bay
14-8-40		Hurricane		shot down by Do.17,cr in Christchurch Bay
14-8-40	P3310	Spitfire 1	151 Sq	shot down,cr in sea off Christchurch
14-8-40	N3024/PR-H	Spitfire 1	609Sq	Shot down into sea off Bournemouth, 1730 hrs.
15-8-40		Hurricane	87Sq	cr -landing at Symondsbury
15-8-40		Hurricane	87SQ	cr at Abbotsbury Swannery,Pilot killed
15-8-40		Hurricane I	87 SQ	cr in sea off Portland
15-8-40	P3215	Hurricane I	87SQ	cr in sea off Portland
15-8-40	R6985	Spitfire I		Shot down and cr in sea off Dorset coast
15-08-40	K9954	Spitfire 1	152Sq	w/o after combat damage.Warmwell.
15-8-40	R6988	Spitfire I	234Sq	cr at Walsford Rd Bournemouth.Pilot Killed
25-8-40	?/3M+KH	Bf.110	II/ZG2	cr Priory Farm, East Holme(shot down by 609 Sq)
25-8-40	?/3M+KM	Bf.110	II/ZG2	Shot down by 609Sq,cr at East Chaldon,2 killed
25-8-40	N2646	Hurricane I	213SQ	cr landed at Burton Bradstock. a/c recovered .
25-8-40	N2766	Hurricane I	213Sq	cr in sea off Portland
25-8-40	N3266	Spitfire I	602Sq	Shot down and cr Dorchester
25-8-40	P3200	Hurricane I	213Sq	cr in sea off Portland
25-8-40	R6810	Spitfire I		cr in sea off Portland
25-8-40	R6994	Spitfire I		Shot down and cr in sea off Dorset coast
25-8-40	V7250	Hurricane	87Sq	Shot down,cr in flames New Barn,
		Bradford Peverell,pilot S Wakeling killed		
25-8-40	V7226	Hurricane 1	213Sq	cr Portland Area, Pilot J Phillippart killed
25-8-40		Hurricane	213SQ	shot down by Bf.109s,cr in Lyme Bay,
		pilot missing		
25-8-40		Hurricane	213SQ	shot down by Bf.109s,cr in Lyme Bay,
		pilot missing		
25-8-40		Bf.109		cr Chesil Beach,pilot drowned
25-8-40		Bf.110		shot down and cr Tatton House Chickerell
		2 crew killed		
25-8-40		Bf.109	JG53	shot down and cr Tatton House Chickerell
25-8-40		Bf.110C-4	1/ZG2	shot down by 609 Sq and
		cr Creech Barrow Hill,Church Knowle		
25-8-40	P9381	Spitfire 1	602Sq	cr Galton Heath after pilot baled out
27-8-40	R6831	Spitfire I	152Sq	cr in sea off Portland
6-9-40	N3061	Spitfire I	234Sq	Shot down and cr in Weymouth Bay
14-9-40	P6362	Magister 1	32MU	Hit cliffs north side of Emmetts Hill,
		Worth Matravers.		
15-9-40		He.111		cr in sea off Portland
25-9-40	6305/G1+BH	He 111P	1/KG55	Shot down and forced
		landing at Westfield Farm Studland.1210Hrs.		
		Pilot was Fw Fritz Jürges. 5 crew 1 killed, 2 wounded.		
25-9-40	2803/G1+LR	He 111P	7/KG55	cr on "Chatsworth"Westminster Rd,
		Branksome Park.4 killed		
26-9-40	K6882	Spitfire I	152Sq	cr in sea off Swanage
27-9-40	3378/S9+DK	Bf.110D-3	2Staffel-Epr/GR210	
	s/d and cr Busseys Stool Farm,Tarrant Gunville at 1200 hrs,			
	Pilot- Hptm Martin Lutz.2 killed			
27-9-40	4270/S9-DU	Bf.110D-3	Epr/GR210	S/d and forced landing at
	The Beeches ,Preston Hill Iwerne minster Pilot Fw Friedrich Ebner			
27-9-40	3888/S9-JH	Bf.110D-3		s/d by 504 Sq and cr at
		Bradle Row,Kimmeridge.Pilot: Ltn Gerhard Schmidt + 1 killed.		
27-9-40	2248/S9+GK	Bf.110D-3	Epr/GR210	cr in sea off coast.
		Obltn Wilhelm Rössiger + 1 missing		

27-9-40	3629/3U+IM	Bf.110C-7	4/ZG26.	s/d and cr at Salters Wood,
	Middle Bere Fm,Arne by 609 and 152 Sq			
	Pilot: Obltn Arthur Niebuhr and one other killed			
27-9-40	3290/3U-DS	Bf.110C-4	III/ZG26	Forced landing after combat,
	1 mile SW Kimmeridge. Pilot - Uffz Fritz Schupp			
27-9-40	2168/3U+BD	Bf.110C-4	III/ZG26	s/d and cr in sea off Dorset coast.
	2 missing.A/c identity unconfirmed. 2 killed			
27-9-40	3297/3U+FT	Bf.110C-4	III/ZG26	Mid-air collision with X4107 Spitfire,
	cr at Bellamy's Farm Piddletrenthide.			
	pilot Gefr Georg Jakstadt baled out and captured.			
27-9-40	X4107	Spitfire I	609Sq	mid-air with above,cr Chesilbourne,
	nr Piddlehinton,P/O Miller killed			
30-9-40	?/"BLACK-2"	Bf.109	5S/JG2	Shot down,cr at Hundred Acres Field,
	Spriggs Farm,Sydling St Nicholas,Pilot killed.			
30-9-40	0847	Bf 109 E4	2./JG2	cr ntr Dorchester after combat
30-9-40	L1702	Hurricane I	238Sq	Mid-air collision with
	N2474(238 Sq Hurricane)Both a/c cr nr Shaftesbury-both pilots survived after bale-outs			
30-9-40		Spitfire		Forced landing Parley Common
30-9-40	L1764	Hurricane I		cr landing on Chesil Beach,nr Abbotsbury
30-9-40	N2434	Hurricane I	56Sq	cr Okeford Fitzpaine.
30-9-40	N2474	Hurricane I		Mid-air collision with
	L1702(Spitfire) over Shaftesbury			
30-9-40	P2866	Hurricane I	56Sq	Cr landing Longcutts East,Winfrith,Newburgh.
30-9-40	P2987	Hurricane I	504Sq	Forced landing fuel shortage nr Whitcombe Barn
30-9-40	P3088	Hurricane I	56Sq	cr in sea off Portland
30-9-40	P3414	Hurricane I	504 Sq	Shot down,cr in sea off Weymouth
30-9-40	P3655	Hurricane I	56Sq	cr in sea off Portland
30-9-40		Hurricane	87Sq	cr Oborne, Rd Sherborne
1-10-40	P3599	Hurricane I	238Sq	Shot down,cr in Poole Harbour
7-10-40	?/3U+BT	Bf.110	9S/KG26	Flew into Hyde Hill,s of Stoborough.2 killed
7-10-40	?/3U+JP	Bf.110	6S/ZG26	cr Brickhills Field ,
	nr Kingston Russell House,2 killed			
7-10-40	?/3U+JT	Bf.110	9S/KG26	Shot down,cr landing Corfe Castle,1 killed
7-10-40	?/9K+5N	Ju.88	5S/KG51	s/d,cr Tappers Hill,nr Sydling St.Nicholas
7-10-40	N3039	Spitfire I	152 Sq	cr and burned Shatcombe Farm,Wynford Eagle,
	pilot died later of burns			
7-10-40	N3231	Spitfire I	609Sq	Shot down and cr Child Okeford
7-10-40	N3238	Spitfire I	609Sq	cr Watercombe Farm (near Warmwell).Pilot killed
7-10-40	V6777	Hurricane I	238Sq	s/d,cr at Great Hill,nr Winterborne Houghton
7-10-40	X4472	Spitfire I	609Sq	Forced Landing at Vale Farm,Sutton Waldren
7-10-40		Bf.110	ZG26	shot down by 609Sq and cr Owermoigne
7-10-40		Bf.110	ZG26	shot down by 609Sq,cr in sea
	1 mile of Arish Mell Gap,Lulworth			
7-10-40		Hurricane	56Sq	Cr Austral Farm,Alton Pancras
10-10-40	P3421	Hurricane I	56Sq	s/d,cr Manor Farm,Wogret,Wareham.Pilot killed
10-10-40	P3984	Hurricane I	238Sq	s/d and cr n of Castle Hill,Corfe Castle
11-10-40	P9301	Spitfire 1	152Sq	cr 2m E of Dorchester
15-10-40	1588	Bf.109 E-4	I/JG2	listed by Luftwaffe as missing
	over Christchurch Bay see Below			
15-10-40	3279	Bf.109 E-1	II/JG2	listed by Luftwaffe as missing
	over Christchurch Bay see Below			
15-10-40		Bf.110		shot down by 609Sq,cr Bournemouth,

possibly one of the two above
18-10-40 R6607 Spitfire I 152Sq cr Tadnoll Mill,Chaldon Herring,pilot killed
29-10-40 3657 Bf.109E-4 III/JG2 Listed-missing over Christchurch Bay-Luftwaffe
6-11-40 ?/6N+AH He.111 KG100 forced landing West Bay,Bridport,
pilot thought he was over France.
5-11-40 Hurricane 238Sq s/d by JG2 a/c &cr Tarrant Hinton
5-11-40 Hurricane 238Sq s/d by JG2 a/c &cr Tarrant Monckton
5-11-40 V7535 Hurricane 238Sq s/d by JG2 a/c &cr Manor
Farm Sturminster Newton Wreck excavated 2006
11-11-40 X4450 Spitfire 1 152Sq forced landing in heavy rain.
14-11-40 Ju.88 Shot down and cr Ringwood Rd.Poole
23-11-40 X4025 Spitfire 1 Overshot,overturned at Warmwell.
28-11-40 P9427 Spitfire I cr in Poole Bay
28-11-40 R6597 Spitfire I 152Sq Shot down,cr Arne nr Wareham.Pilot killed
29-11-40 R6907 Spitfire I 152Sq cr Field Grove,Durweston,
pilot suffered anoxia -killed.
30-11-40 Bf.109 LG2 cr landing Woodyhyde Farm,Worth Matravers
16-11-40 R9015 Lysander III 16Sq cr Broadwindsor.
4-1-41 Do.17 cr in sea of Portland
4-1-41 V6758 Hurricane I 238Sq Forced landing Warmwell Airfield.
21-2-41 Hurricane 32Sq cr St Clements Rd Bournemouth after Victory roll
1-4-41 P8011 Spitfire 1 234Sq Destroyed in air raid at Warmwell.
3-4-41 T4299 Whitley V 51Sq shot down(friendly fire - by 87 Sq Hurricane!),
crCoonegar Farm,Manston,1 killed.
5-4-41 He.111 cr Dorset Ridgeway.
12-4-41 2002/1G+HT He111P-2 9/KG27 s/d and cr Prowers Farm Lydlinch,3 killed
28-4-41 K9230 Battle I cr in sea off Hengistbury Head,pilot drowned
4-5-41 Ju.88 cr on Winfrith Heath Decoy Airfield
7-5-41 2513/1G+BR He111-H5 7/KG27 s/d by Beaufighter(600SQ),
B/u in air and cr at Foxwell Farm,Oborne
3 crew killed - one survivor.
12-5-41 G-ADHK Short C Class BOAC "Maia",destroyed Poole Harbour by He.111
12-5-41 ?/G1+ES He.111 8S/3/KG55 Shot down cr atPatchin's Pt,
Arne,a/c involved in G-ADHK incident
19-5-41 3814 Bf.109E-7 I/JG2 cr in Channel off Portland(Luftwaffe records)
19-5-41 6439 Bf.109E-7 I/JG2 cr 5 km S of Portland(Luftwaffe records)
22-5-41 3974/1G+ZM He-111H-8 4/KG27 hit hill nr Lulworth,
cr Chideock Farm, Chaldon Herring
2 killed ,3 survivors
6-6-41 Bf.109e 7G/J2 cr at Worth Matravers
9-6-41 5983/White15 Bf.109E7Z 3/JG2 listed by Luftwaffe as missing in Swanage area
15-6-41 3248/6N+DK He.111H 2/K Gr100 s/d by 604 Sq,cr at Plumber,
nr Sturminster Newton,5 killed.
14-7-41 P8656 Spitfire I 56Sq cr,forced landing Longcutts East,East Knighton
17-7-41 P4832 Blenheim IV cr in sea off Purbecks
4-8-41 P8516 Spitfire I 118Sq cr into hill S of Owermoigne at Holworth Farm
6-8-41 P6983 Whirlwind I 263Sq forced landing Hurn
10-9-41 R6639 Spitfire I 53OTU cr West Lulworth during forced landing
7-10-41 L6860 Lysander II 41OTU cr at Stalbridge
11-10-41 X9677 Wellington IC 218 Sq cr in sea off St Albans Head,3 drowned
21-10-41 FW.190 flew into Bindon Hill,Lulworth,1 killed
25-10-41 Z4993 Hurricane IIB A&AEE flew into Ridgeway Hill,Upwey

8-11-41	AH872	Tomahawk	400Sq	Ditched of Chesil beach.
	Remains are on show Weymouth Museum			
11-11-41	?/GZ		32Sq	cr onto ammo dump Warmwell.
	Pilot + 2 on ground killed			
29-11-41	L9405	Blenheim IV		cr in sea off Chesil Beach
16-12-41	R7142	Spitfire I	140Sq	Dived into ground near Rempstone
16-12-41	X9785	Wellington IC	217Sq	Cr ldg Holm Farm,West Milton- engine failure
25-01-42	AA813	Spitfire	1PRU	Cr Chesil Beach
12-2-42	AD472	Spitfire	350Sq	w/o in collision at Warmwell airfield.
16-2-42	R9306	Stirling II	90Sq	cr near Blandford
25-2-42	R7148	Spitfire 1	52OTU	forced landing nr Shaftsbury,engine failure.
26-2-42	P1365	Albemarle	A&AEE	FLEFnr Bridport
23-3-42		Ju88		Shot down by AA while attacking Portland
	cr at Davis's Timber Yard, Chesilton, Portland.			
	see picture at top of page.			
29-3-42	Z3349	Hurricane II	245Sq	forced landing Furzey Island in Poole Harbour
2-4-42		B-17	USAAF	Forced landing Charity Farm,
	Lychett Minster,later flown out.			
15-4-42	AD297	Spitfire	302Sq	w/o in collision Warmwell.
21-4-42	13005/blue12	Bf109 F-4/B	10(J)/JG2	cr in sea nr Portland
25-4-42	AB179	Spitfire	501Sq	forced landing at Worth Matravers.
26-4-42	1120/F8+EM	Do217E-4	4/KG40	cr at Bottlebush Down ,Handley Cross.4 killed
4-5-42	W3306	Spitfire	302Sq	Landing accident Warmwell.
4-5-42	BL548	Spitfire	124Sq	cr at Worth Matravers.
6-5-42	N3980	Magister	302Sq	cr near Wareham
11-5-42	G-ADHK	Short S21 Maia		Destroyed by enemy attack Poole.
23-5-42	4627/6N+FR	He111H-6	LK17	cr at Elcombe Farm,Alvediston,5 killed.
30-8-42	T6568	DH82A		Crashed in forced landing Kingston nr Hazlebury
15-9-42	AM466	Spitfire	66Sq	forced landing 2m SE Warmwell
16-9-42	EP118	Spitfire	501Sq	Collided with Typhoon on t/off at Warmwell
17-9-42	AB491	Spitfire	501Sq	cr Lyme Bay,pilot killed.
8-10-42	P7014	Whirlwind I	263Sq	cr on take off Warmwell
21-10-42	5331	FW190A-3	5/Jg2	s/d & cr Bindon Hill
	Lulworth Cove at 2110hrs Pilot Brychy killed			
23-10-42	Z4993	Hurricane 1	A& AEE	hit Ridgeway Hill,Upwey(in mist).Pilot killed
24-10-42	R7695	Typhoon IA	266Sq	Broke up and cr at Glanvilles Wooton
27-10-42	R8823	Typhoon IB	266Sq	overshot landing and cr Warmwell
15-12-42	R8663	Typhoon IB	257Sq	cr following forced landing at Chilfrome
24-1-43	DT684/BY	Halifax II	58Sq	cr Kingston Lacy Park Pamphill.
	8 crew killed,including pilot John Andrews from Ringwood,Hants			
	Memorial erected 24-1-2000			
9-2-43	P6991	Whirlwind I	263Sq	cr on take off Warmwel
16-2-43	R9306	Stirling 1		cr Bold Barrow Hill,west of Blandford.4 killed
?-2-43		Do.17		cr near Beaminster
7-5-43	P7057	Whirlwind I	263Sq	cr landing Warmwell
15-3-43	EP715	Spitfire	19Sq	cr 3m S Sherborne- engine failure.
23-3-43	G-AGDA	PBY Catalina	BOAC	cr Poole Harbour while doing circuits.
	At least one casualty and one rescued.			
24-3-43	BS448	Spitfire	616Sq	collided with BR302 and cr at
	Higher Waterston,Piddletrenthide			

18-4-43	BR590	Spitfire	616Sq	Ditched Swanage due engine failure.
22-5-43	P7059	Whirlwind I	263Sq	landed Warmwell with engine fire
23-5-43		FW-190d		s/d,cr at St Ives Hotel Grove Rd Bournemouth
29-5-43	DE355	DH82A		Spun into ground Warmwell
25-6-43	MB315	Seafire IIC		Overshot landing Christchurch,
		cr on house in Caroline Av		
28-6-43	41-6573	P-47C	4FG	Accident at Warmwell
28-6-43	41-6539	P-47C	4FG	Accident at Warmwell
10-7-43	EB687	Spitfire VC		w/o in ground collision at Hurn
13-7-43	P7110	Whirlwind I	263Sq	cr nr Warmwell during forced landing
?-7-43		Whitley		cr on take off at Hurn
1-8-43	P6981	Whirlwind I	263Sq	cr landing at Warmwell
3-8-43	PA106	Spitfire	761Sq	cr 4m NE Beaminster after collision with NX949.
9-9-43	BL920	Spitfire	67Sq	cr 1m E Bishops Caundle.Op by USAAF
10-9-43	P7096	Whirlwind I	263Sq	cr landing at Warmwell
22-9-43	42-7919	P-47D.	4FG.	Accident at Warmwell
8-11-43	NX913	Spitfire	761Sq	cr on apptroach Henstridge.
11-11-43	AL762	Boston III		Belly landing Dorschester
15-11-43	FR174	Mitchell III		cr landing Tarrant Rushton with battle damage
28-11-43		Spitfire	761Sq	Cr Water Lane ,Cranbourne
1-12-43	MA799	Spitfire	131Sq	cr Everley Farm Blandford.
5-12-43	42-3297	B-17	571BS	ditched nr Abbotsbury CG stn,- 1 killed.
11-12-43	43-12196	P-51B.	354FG,	cr 1 mile offshore S of Portland Bill/Southwell,
		explosion in flight		
17-12-43		Horsa		over ran landing Tarrant rushton and crashed.
5-1-44	21132/G	B-17	USAAF	Forced landing Tarrant Rushton due combat damage.
20-1-44		Hamilcar	38Grp	Overshot and hit building Tarrant Rushton.
		no casualties.		
26-1-44		Halifax	ODU	cr in sea off Bournemouth Pier
20-2-44	EF468	Stirling III	196Sq	Cr on approach Tarrant Rushton .A/c came down
				Bussy Stool Farm,Tarrant Gunville. 6 killed
8-3-44	42-67945	P-38J	370FG	Accident at Zeals
12-3-44	MN129	Typhoon IB	263 Sq	cr just west of Warmwell during aerobatics,
		pilot killed		
15-3-44		Horsa		cr into Nissen Hut landing Tarrant Rushton
16-3-44		Horsa		forced landing nr Westbury.
16-3-44		Halifax		Belly landing Tarrant Rushton.
21-3-44	LD972	Hurricane IV	439Sq	cr 2 miles east of Hurn after mid-air
		with P-47D from Christchurch.pilot killed		
22-3-44	JP137	Halifax II	1865CU	cr Moordown,Bournemouth,2 on gnd+ 7 crew killed
4-4-44	42-67674	P-38J	326FRS/31ATG	Accident at Warmwell
11-4-44	LJ822	Stirling IX	190Sq	Cr Knighton Farm,Hampreston
		6 mins after t/o from Tarrant Rushton 6 killed.		
20-4-44	42-67662	P-38J	430FS/474FG	Accident(LAC) at Warmwell
22-4-44	42-67509	P-38J	428FS/474FG.	Accident(LAC) at Warmwell
27-4-44	42-67506	P-38J.	429FS/474FG.	Accident(LAC)at Warmwell
24-4-44	180414/U5+GH	Ju188E-2	1/KG2	s/d by AA fire cr Salterns Wood,Arne.5 killed
25-4-44	MK212	Spitfire	443Sq	Forced landing 6m SW Spettisbury - OG
25-4-44	MK321	Spitfire	443Sq	forced landing Puddletown -ran out of fuel.
30-4-44		P-47D	405FG	cr at Highcliffe School
2-5-44	42-67676	P-38J	474FG	Taxying accident at Warmwell
13-5-44	LH520	Horsa		Overshot landing Tarrant Rushton and

		hit a Halifax("QQ"). 1 killed		
13-5-44	LH339	Horsa		Overshot landing Tarrant Rushton and
		hit a Halifax . no casualties		
21-5-44	42-67645(unconfirmed)	P-38	474FG	cr at Cheselbourne.Pilot killed
22-5-44	/H	Halifax	644Sq	cr landing Tarrant Rushton.no casualties
22-5-44		Hamilcar		over ran landing Tarrant Rushton, u/c collapsed.
23-5-44	42-67487	P-38J.	474FG	Accident at Warmwell
24-5-44		Glider(Hamilcar ?)		cr at Tarrant Rushton.
27-5-44	LL346 /E	Halifax V	644Sq	Took off from Tarrant Rushton towing
		Hamilcar glider, failed to gain height,		
		abandoned glider and crashed in Ashley Wood, Tarrant Keyneston.		
25-5-44		Wellington		cr nr Christchurch
27-5-44	42-67678	P-38J	474FG	Overshot landing Warmwell
28-5-44	42-67654	P-38J	474FG	Take off accident at Warmwell
29-05-44	LN443	Wellington	82OTU	s/d in error by friendly a/c.
				cr 4m SW Sturminster Newton
30-5-44		Horsa		cr at Moor Critchell -on training flight
		from Tarrant Rushton		
30-5-44		Horsa		cr at Shapwick -on training flight
		from Tarrant Rushton		
30-5-44		Horsa		cr at Spettisbury -on training flight
		from Tarrant Rushton		
4-6-44	42-68703	C-53D	315FRS/31ATG	cr 8 miles N Warmwell - loss of control
6-6-44	42-67672	P-38J	430FS/474FG	accident(LAC) at Warmwell
6-6-44	43-104408	P-38J	430FS/474FG	accident(LAC) at Warmwell
6-6-44	42-67189	P-38J	430FS/474FG	accident(LAC) at Warmwell
6/7-6-44	LW377/OW-G	Halifax III	426SQ RCAF.	Crew bailed out over Slapton Sands
		Aircraft cr (where?)		
12-6-44	42-67652	P-38J	474FG	accident at Warmwell
14-6-44	43-28711	P-38J	474FG	accident at Warmwell
18-6-44		Horsa		cr at end of RW01 Tarrant Rushton.
18-06-44	42-99100	L-5	153LS/9AF.cr	Warminster(KCR)
23-6-44	43-28530	P-38J	474FG	accident at Warmwell
23-6-44	43-28538	P-38J	474FG	accident at Warmwell
23-6-44	42-67265	P-38J	474FG	accident at Warmwell
25-6-44	AB975	Spitfire	277Sq	cr Sherbourne.
25-6-44	NF511	Spitfire	886Sq	forced landing Godlingstone Heath,Swanage.
25-6-44	42-104424	P-38J	474FG	Landing Accident at Warmwell
26-6-44	42-100888	C-47A	437TCG	Flew into Godlingstone Hill.Swanage
29-6-44	42-76245	P-47D	509FS405FG	cr on take off Christchurch ,
		hit house in Foxwood Av		
29-6-44	42-76476	P-47D	509FS405FG	cr on take off Christchurch ,
		hit bungalow in Foxwood Av		
29-6-44	42-26338	P-47D	509FS405FG	hit by explosion of above aircraft.
		total of 16 killed		
29-6-44		P-47D	405FG	landed short at Christchurch
		and overturned in Lymington Rd Highcliffe		
7-7-44	42-104322	P-38J.	474FG	Accident at Warmwell
11-7-44	43-28728	P-38J.	474FG	Caught fire on take off Warmwell
23-7-44		Mosquito	418Sq	cr Upper Parkstone,nr Alder Rd Drill Hall,2K
26-7-44	RJ262	Horsa		Overshot landing Tarrant Rushton and
		hit Halifax"AG" 298SQ.		

?-7-44		Liberator		cr on Furzey Island,Corfe Castle
9-8-44	42-96244	B26F	497BS/344BG	Take off accident at Zeals
25-8-44	/P-O	Halifax	644Sq	U/c collapsed landing Tarrant Rushton.
27-8-44	/U	Halifax	644Sq	left RW landing Tarrant Rushton and ended up nr Preston Farm. w/o.
11-9-44	K9969	Spitfire	761Sq	Ground collision with Master W9026 Henstridge.
20-9-44	LL256/T-S	Halifax V	298SQ	Ran out of fuel- belly landing nr Middle Wallop after diverting to Harwell due weather at Tarrant Rushton.1 killed.
3-10-44		Barracuda		cr Portland harbour
14-10-44	LL310	Halifax V	644Sq	crash landed 2 miles west of Tarrant Rushton after engine failure.
2-12-44	ML250	Spitfire	416Sq	forced landing Morden,engine failure.
7-1-45	MB152	Spitfire	761Sq	collided with MB306,cr 1m S Henstridge airfield
7-1-45	MB306	Spitfire	761Sq	see above
16-1-45	43-7173	P-51B	355	ran out of fuel cr Moreton, Warmwell
25-1-45	AB828	Spitfire	277Sq	forced landing Cheselbourne
17-2-45	NH276	Spitfire	12FU	Flew into cliffs at Kimmeridge in poor vis.
17-2-45	PT360	Spitfire	12FU	As above
22-2-45	NX882	Spitfire	761Sq	Stalled on app at Henstridge.
12-3-45	EM625	Martinet	17 A.P.C.	cr landed at Burton Mere due engine failure
23-3-45		Beaufighter		Cr Chesil ranges
27-3-45	NA664	Halifax IVb	298Sq	Cr and burned at South Farm ,Spettisbury while on approach to Tarrant Rushton , 6 killed
29-3-45	PR150	Spitfire	761Sq	Flew into high ground West Lulworth
28-4-45	NN462	Spitfire	761Sq	Pilot baled out after collision withn NN254, cr at Marnhull
3-5-45	RX219	Spitfire	718Sq	cr 3m N of Henstridge after collision with NN646.
17-5-45	T6869	DH82A		Undercarriage collapsed on landing Tarrant Rushton
22-5-45	PR117	Spitfire	761Sq	cr 3m W of Henstridge.
23-5-45	NF646	Spitfire	718Sq	cr 3m NE Henstridge after collision with Seafire RX219.
30-5-45	T6800	Dh82A		Hit ridge low flying Norden Farm Dorset
9-6-45	SM414	Spitfire	412Sq	forced landing nr Warmwell
15-6-45	JT985(ex Bu 90033)	Liberator IX	232Sq	Hit hill nr Kingston, Purbecks, in bad weather, 5 crew and 22 pax killed.On 25 Oct 2007 a memorial seat was dedicated to these and the 3 casualties from Swordfish K5985 which crashed 18-03-38 killing 3 on board.
18-6-45	KH694	Mustang		Wing fell off,cr Portland Bay
23-6-45	NN411	Spitfire	761Sq	Spun in at Margaret Marsh.Pilot killed.
27-6-45	NH812	Spitfire	414Sq	overshot and overturned landing at Warmwell.
15-7-45	866	B-17	306BG	Overran landing at Christchurch,damaged
15-7-45	NL976	DH82A		Dbr in gale Warmwell
6-8-45		unidentified a/c		cr nr Chesil Bank- pilot killed
28-8-45	NN462	Seafire III	761 Sqd	Collision over Marnhull
9-11-45	N6658	Tiger Moth	2EFTS	forced landing at Thornford
9-11-45	PP997	Spitfire	761Sq	spun inj at West Orchard ,pilot killed.
2-1-46	EE335	Gloster Meteor F3	74Sqdn	crashed approx 2 miles East of Warmwell airfield close to Moreton Crossroads after making a low run over the airfield.
30-1-46	NN498	Spitfire	759Sq	cr 2m W of Henstridge.
22-7-46	NN349	Seafire III		cr Lulworth Cove , engine failure,pilot killed
4-3-46		Hythe	BOAC	damaged landing PooleHarbour, w/u and scrapped."Hailsham"

8-7-46	NA461	Halifax	297Sq	cr on take off Tarrant Rushton 6 killed.
9-7-46	SX244	Seafire F17.807Sq, This a/c collided with SX179		
		and crashed at		
		Studland Bay 9/7/46.Freighter 'Energie' picked up the body		
		of FK Barlow a few days later.Parts of a wing were washed		
		up 25/12/92. SX179 made it back to base		
22-07-46	NN349	Seafire F.III	Yeovilton storage RN,off Lulworth Cove, Dorset,	
		Went into sea on test flight		
14-8-46	G-AGUC	Dove 1 (2nd Prototype)	written off at West Howe after t/o Hurn	
19-7-47	RH752	Brigand I ,A& AEE cr ne Chesil Bank.Pilot killed		
15-10-47	TS371	Wyvern prototype	Westlands Engine failed,cr Cattistock,pilot killed	
19-11-47	G-AGEV	Sunderland 3	BOAC	Accident when landing Poole
Grounded on Brownsea Is.Immersed by tide 4 times				
		Taken to Hythe and scrapped		
6-5-49	G-AIFF	Bristol Freighter.cr in sea 16M S of Portland while on s/e test.7 killed		
17-7-49	G-AHUH	Taylorcraft Plus D	Crashed onto Ballard Down,nr Swanage	
23-7-49	EK747	Firebrand TF.5	813 Sqd	Engine failed, force landing in Poole Harbour
?-1-50	G-AKRD	Ambassador	belly landing Hurn	
23-04-50	EK797	Firebrand TF5	813 Sq RN.Off Portland,	
		Ditched after throttle linkage parted;		
		pilot picked up by HMS Headingham Castle		
13-11-50	G-ALFR	Ambassador	Very hard landing at Christchurch,	
		substantially damaged,repaired.		
29-08-51	TF918	Sea Fury F10	767 Sq	RN .Folke,5m S of Sherborne, Dorset,
		Crashed near farmhouse attempting forced		
		landing after engine failure		
5-4-52	G-AGXF	Autocrat	Crashed at Litton Cheney NW of Abbotsbury.	
25-4-52	TG375	Vampire F1	Crashed in forced landing 2m W of Chideock	
20-6-52	RJ762	Barracuda	750Sq	cr in sea off Highcliffe,
		parts recoved by MEXE,Christchurch 4-6-68		
31-8-52	G-AJEN	Autocrat	Crashed at Puncknowle north west of Abbotsbury	
31-10-52	VX297 200/CW	Sea Fury T20	738 Sq	Ditched off Lyme Regis after engine failure.
26-3-53	VV467	Vampire FB.5	210 AFS	Engine failed, force landing S of Bere Regis
?-6-53	Vampire	AFS	abandoned take off and cr at Tarrant Rushton	
6-6-53	G-AKZZ	Tiger Moth	Christchurch Aero Club cr in sea Bournemouth Pier	
02-04-54	SP351	Seafire F17	764 Sq RN.Sm SW of Warminster, Crashed low level exercise	
11-5-54	Sea Venom	cr on take off Hurn killing		
		motorcyclist on road past airfield		
23-2-56	WP193	Hunter F.5	34 Sqd	Engine failed, crash west of Blandford
29-10-56	XG636	Sea Venom FAW21	891Sq	ditched in Portland Harbour
25-6-57	WE597	Auster T.7	LAS	Hit power lines w of Blandford cr.
15-7-57	WV221/U	Whirlwind HAS22	845SQ	ditched 6 miles off Portland Lighthouse
26-7-57	TW739/057	Firefly TT4	FRU	cr landing Hurn
9-8-57	WF176/034	Seahawk FB3	FRU	cr landing Hurn
21-11-57	WF220	Seahawk FB3	FRU	cr landing Hurn
20-4-58	G-AIZA	Proctor	cr short of runway at Hurn	
1-5-58	XG609	Sea Venom FAW21	766Sq	cr in sea off Lulworth Range
27-9-58	XL848	Whirlwind HAS.7	848 Sqd	Ditched into Portland Harbour
21-4-59	XG579/304	Whirlwind HAR3	815 SQ	ditched of Portland
29-4-59	XJ397/309	Whirlwind HAR3	815Sq	cr in sea off Portland
20-07-59	XG584	Whirlwind HAR3	815Sq	Ditched Portland Harbour- engine failure.
22-11-59	G-AJEP	Autocrat	swung landing at Christchurch,	
		hit pile of logs and w/.o		

20-1-60	XM664/776PO	Whirlwind HAS7	737SQ	Ditched off Portland
4-2-60	XM661/774PO	Whirlwind HAS7	737SQ	Ditched off Portland.Engine failed.
17-5-60	XK993/770PO	Whirlwind HAS7	737SQ	Ditched off Portland.
		salvaged and used as instructional airframe		
15-7-60	G-APLC	Tiger Moth		Hit power lines near Shaftesbury whilst crop spraying.
27-7-60	XK909/775PO	Whirlwind HAS7	737SQ	Ditched off Portland due to engine fire
11-11-60	WF766	Meteor T7	A&AEE	MoD(PE). cr 3m NW of Lyme Regis, Dorset,
		Broke up in air		
14-2-61	G-AMBI	Tiger Moth		DBR in force landing at Stourpaine.
4-3-61	G-ANSR	Tiger Moth		Crashed into sea off Studland.
20-3-61	XL876	Whirlwind HAS7	737Sq	Ditched off Portland due Fire on board.
19-07-61	XN333	P.1953 Wasp	771 Sq	RN off Portland,Ditched - tail rotor failure
20-7-61	XJ569	Sea Vixen FAW.1	899 Sqd	Abandoned in spin and crashed
		5 miles from Dorchester.		
31-7-61	XL873	Whirlwind HAS7	737Sq	Ditched of Portland - engine Failure
31-08-61	XK529	Buccaneer S1	A&AEE	MoD(PE),.Lyme Bay, Dorset, Stalled on catapult
		launch from HMS Hermes and crashed in sea		
11-1-62	G-ALTP	Oxford .		damaged beyond repair by engine fire at Christchurch
03-03-62	XN334	Saro P.1953	1771 Sq RN	HMS Ashanti off Portland,
		Ditched immediately after take-off		
25-7-62	WV919	Seahawk FGA4	FRU	cr landing Hurn
17-08-62	XP146	Wessex HAS1	737 Sq RN	Off Portland, Ditched after lost
		control on night A/S sortie		
14-1-63	XL853/337C	Whirlwind HAS7	824Sq	Ditched Portland harbour - engine failure.
20-9-63	XD213	Scimitar F.1	803 Sqd	Problems landing on HMS Victorious in Channel,
		pilot ejected		
		and Scimitar crashed at Chaldon Herring.		
26-10-63	G-AMHF	Tiger Moth		Crashed in field near Gallows Hill,Bovingdon.
25-11-64	XN708	Sea Vixen FAW.1	890 Sqd	Crashed Lyme Bay at night during mock attack.
08-07-65	XP144/775PO	Wessex HAS1	737 Sq	RN off Portland, Dorset,
		Ditched in English Channel after engine failure		
17-3-66	XS581/V241	Sea Vixen FAW2	893Sq	Crashed Lyme Bay at night during mock attack.
4-10-66	XT425/502	WaspHAS1	829Sq	ditched off Portland
16-11-66	XL882/514	Whirlwind HAS7	829Sq	Ditched nr Portland
8-8-67	XP137	Wessex HAS3		Severly damaged in forced landing at Rampisham,
		East of Beaminster,rebuilt.		
13-11-67	XS864 404/DV	Wessex HAS1	829 Sq	Devonshire Flt RN Off Portland,
		ditched and sank in sea following engine failure		
17-5-68	XL878/PO514	Whirlwind HAS7	771Sq	Ditched off Weymouth Pier
15-7-68	WV253/24	Hunter T7	ETPS	cr in sea off Lyme Regis
6-10-68	XM687/PO515	Whirlwind HAS7	771Sq	cr nr Weymouth after tail cone detached
6-10-68	G-APRX	DH82A		Crashed Compton Abbas
9-10-68	XM665/PO512	Whirlwind HAS7	771Sq	FL nr Weymouth below White Horse Hill
		and rolled over.		
13-2-69	WL350/844	Meteor T7	FRU	cr at Blandford during A a QFI check flight.
		Both crew(Mr R Woolley & F/Lt R V Patchett) killed.		
20-6-69	XL868/57	Whirlwind HAS7	705Sq	crashed in Portland Harbour,
		recovered ,to instructional A2595		
23-8-69	XT509	Soiux AH1	ARWF	MAC with XW191 during Display at Christchurch
23-8-69	XW191	Soiux AH1	ARWF	see above,both a/c Blue Eagles display team
2-9-69	XL881	Whirlwind HAS7	771Sq	Ditched in Channel - engine failure
9-12-69	XV637	Wasp HAS.1	829 Sqd	Ditched off Portland
1-5-70	WJ632	Canberra TT18	A&AEE	cr in Lyme Bay,2 killed

3-5-70	XV566/R010	Phantom FG.1	892Sq	cr in Lyme Bay.2 killed
20-5-71	XM875/PO516	Wessex	771SQ	cr in sea off Portland.3 killed
14-07-71	XP174/521PO	Wessex Has3	737SQ	cr in sea off Portland
15-11-71	XP116	Wessex HAS3	737Sq	cr in sea off Portland
13-1-72	XV645/PO529	Sea King	737Sq	cr in sea off Portland
16-2-72	XS121/PO435	Wessex HAS.1	737SQ	cr in sea off Portland
28-01-72	D-ANEF	Viscount 814	Lufhansa	crashed on landing Hurn.
	damaged and withdrawn from use			
24-6-73	G-ASHF	C-150C		Broke up in midair over Poole Harbour
2-8-73	XV675/665PO	Sea King HAS.1	737 Sqd	Ditched off Portland
15-7-74	XP138/654PO	Wessex HAS3	737Sq	Ditched off Chesil Bank- 3 killed.
19-11-74	XV644 664/PO	Sea King HAS1	737 Sq	Ditched and sank 20 miles S of Portland.
	Recovered on 27.11.74			
22-11-74	XX136	Jaguar T2	A&AEE	cr nr Brockington Farm .
	Wimborne St Giles- engine fire			
25-7-75	Balloon	"Gerald Heineken"hit power		
	lines at Coles Farm,Langton Matravers			
31-03-76	XV669 BL/410	Sea King HAS1	820 Sq RN	ditched in the English Channel off Portland
	during a sortie from HMS Blake			
18-7-78	XP105/403DV	Wessex Has3	737Sq	ditched off Isle of Wight.
4-8-78	XS507/PO513	Wessex HU5	772Sq	Rolled over landing at Portland,badly damaged
13-9-78	XP110	Wessex HAS3	737Sq	Ditched 15 miles off Portland Bill EF
12-5-79	G-AXLH	Nipper		hit trees close to Hurn
24-7-79	G-BGLP	F.172N		Forced Landing Holmsley South on delivery
	flight Reims to Hurn .Slid into a ditch on landing and written off.			
29-4-80	68-057	F-111A	20TFW	Hit hill nr Mapperton(w of Sturminster Marshall)
	2 crew killed			
22-5-80	XT763/515PO	Wessex Hu5	772SQ	Ditched in Wetymouth Bay
27-6-80	XP156/663PO	Wessex Has3	737SQ	Cr in sea off Portland - 3 killed
24-9-80	G-ASFF	Pa-23		Ditched off Bournemouth
11-3-81	XM872/662PO	Wessex HAS3	737SQ	Ditched south of Durdle Dor
	after engine failure.Lt Brian Gell & Lt Martyn Reid rescued by			
	Wessex XS149(John Connell)..Lt Geoff Mackett			
	rescued by SAR Wessex 5(Lt Andy Mckie- 772Sq)			
15-7-81	XP118/664PO	Wessex HAS3	737SQ	Ditched 15M S of Portland
	(Pilot Brian Gell (see XM892 above)			
22-5-82	G-DAVI	TU.206G		Crashed Bellamy Farm,Piddletrenthide
	when a parachute opened in flight- wearer			
	was pulled out of aircraft and			
	tangled with tailplane.At least 2 persons killed			
21-1-83	ZA177/711	Sea Harrier	899Sq	Pilot lost control,cr at Cattistock.
16-05-83	XE716 834/VL	Hunter GA11	FRADU RN	Crashed into the Channel off Portland.EF.
	Pilot Ejected.			
06-09-83	XT427 606	Wasp HAS1	829 Sq HQ Flt RN	Ditched off Portland after suffering
	loss of power shortly after take-off			
20-10-83	ZA194 716/VL	Sea Harrier FRS1	899 Sq RN	Crashed at West Knighton near Dorchester
	following control restriction			
15-04-84	G-OFRL	C414		Went through fence and across road on t/o Hurn
11-6-84	G-BBXI	HP Herald		Wing hit by truck on ground at Hurn
19-8-84	XV569/Q	Phantom FG.1		Had a problem on take-off
	and the navigator ejected			
	while the aircraft was still on the runway.			
	He was badly injured in the subsequent landing but			

				the pilot managed to keep control of the aircraft
				and made a safe landing at RAF Lyneham.
3-12-84	XT767/624	Wessex HU5	772Sq	Hit harbour wall following
				control malfunction ,1 fatality.
8-9-85	G-BDGL	C206		Crashed in woods near Wimborne
24-02-87	XV668 586/-	Sea King HAS5	706 Sq RN	Ditched off Dodman Point during a
				night flying sortie.
15-5-86	G-BGFG	Cheetah		Nosewheel collapsed landing Compton Abbas
10-9-86	G-ASCJ	Pa-24		damaged in wheels up landing at Hurn
9-4-89	G-BHXJ	Norecrin		cr landing at Compton Abbas
8-5-89	XX489/575CU	Jetstream T2	750SQ	Crashed into Portland Harbour
				during the annual displasy killing both crew.
18-7-89	N419FS	TF-100F		Ran off runway when drag chute failed on
				landing at Hurn
04-10-89	ZA191	Sea Harrier FRS1	801 Sq	HMS Ark Royal, Lyme Bay, Abandoned after
				collision with carrier's mast during low-level exercise
10-4-90	XF985	Hunter T8C	FRADU	Crashed at Charminster near
				Dorchester- engine failure
19-5-91	G-BBKB	C-172		Struck hilltop in cloud near Bere Regis
				and lost nosewheel unknown to pilot
				- landed at Hurn on maingear only
25-8-91	G-TEST	Pa-34		undercarriage collapsed landing at
				Hurn during Airshow
25-8-91	WJ682/C-U	Canberra		Burst all tyre landing at Hurn - ran off runway
				and stopped 50 yds from boundary fence
8-4-92	G-OPIG	ARV		Force landed at Bere Regis, nosewheel collapse
31-8-92	E-813	Pampa Ia-63		Cr Hurn during display practise,pilot killed
12-7-90	G-BNSC	Citation		damaged in wheels up landing at Hurn
18-4-93	G-BSTC	Aeronca 11AC		cr on take off Henstridge,damaged
11-7-93	G-BRJY	Rand KR2		Nosewheel collapsed on landing Hurn
3-10-93	G-BPOD	Stolp Starduster		Fatal crash on take off from Askerwell
11-12-93	G-BOYK	Bensen B-8M		Cr nr Charborough Park,
				Sturminster Marshall,Pilot Killed
25-4-94	G-BTVV	C337		Nosewheel collapsed landing at Compton Abbas
1-5-94	G-SVIV	Stampe SV4		cr in field short of runway Compton Abbas
11-7-94	G-BSWA	Luscombe L-8A		ground looped landing Compton Abbas
16-2-95	G-AYND	C310		Undercarriage collapse on landing Hurn
15-8-95	G-BRUG	Luscombe L-8E		u/c collapsed during take off
				at Dudsmoor Farm,near Hurn
10-11-95	N3TQ	C310		Nosewheel collapse on landing Hurn
21-11-96	G-BMZV	C172P		Cr at Compton Abbas after aborted
				go-around,pilot killed
21-3-97	G-NSFT	Pa-28-161		Engine failed while prctising
				forced landings,cr nr Cashmoor Inn
8-4-97	G-ASVO	HP Herald		Struck lighting pole while under tow at Hurn
13-6-97	G-BSWK	R-22		Rolled over on lift off from Hurn
6-11-97	G-FLEN	Pa-28		Deliberately ditched in sea off
				Boscombe in apparent suicide attempt
16-5-98	G-DHWW	Vampire		Undercarriage collapse after landing Hurn
22-5-98	G-LOLO	R-22		Hit ground & rolled over at Hurn
2-6-98	G-AXBH	C172		Crashed on t/o from Compton Abbas
05-04-99	G-OPNI	Bell 206B		Pilot(not IMC rated) became

	disorientated in poor visability and		
	crashed in Lyme Bay,2 miles S of Lyme Regis.No casualties.		
03-08-99	G-SFTZ	T67M	U/c collapsed landing Compton Abbas
26-08-99	G-BDEX	FRA150M.	U/c collapsed landing Compton Abbas.
18-12-99	G-OSOW	Pa-28-140	cr on take off Hurn,3 killed
11-03-00	G-BLFW	AA-5	U/c collapsed- heavy ldg at Compton Abbas
07-07-00	N44DN	PA-46 Malibu 350P	Written off in forced ldg Lychett Matravers.
19-8-00	G-BIPI	Everett Gyroplane	Rolled over during taxi training at Henstridge
10-10-00	G-BYTP	ATR-72	Nosewheel collapse on ldg in high winds at Hurn
01-06-01	G-BXEM	Cricket MKIV	Gyroplane,cr ldg at Henstridge.Pilot killed.
6-6-01	G-BGTT	C-310R	u/c collapsed landing at Hurn
20-7-01	G-WILD	Pitts S.1T	Skidded landing Compton Abbas and
	overturned in adjacent field.		
21-07-02	G-DONI	AA5B	undercarriage collapsed landing Compton Abbas
11-08-01	RA44546	Yak-52	Crashed 1 mile N of Compton Abbas
	during aerobatics.Pilot killed		
23-9-01	G-BXTY	Pa-28	damaged in landing accident at Hurn
04-01-02	G-OFCH	AgBell 206B.	rolled over while in hover at
	Morn Farm Chickerell,damaged beyond repair,no casualties.		
07-07-02	RA44549	Yak-50	Gear-up landing at Compton Abbas.no casualties.
15-07-02	G-BBHM	S.61N.	Coastguard Rescue,burnt out after
	forced ldg at Hamworthy,engine failure,no cas		
08-09-02	G-ATMH	Auster D5-180	Take off accident at Eyres Field.slight damage
16-9-02	G-BYBF	Robin	Damaged at Compton Abbas when struck by
	landing Kitfox 2 G-LEED		
16-09-02	G-LEED	Kitfox,	veered of runway on take off and hit
	G-AYBF (above) at Compton Abbas		
13-11-02	ZF123/ZQ	Sea King HC.4	848Sq cr on deck of RFA Argus off Portland
19-03-03	G-BOXB	Pa-28	cr on t/o at Gorwell Farm,Little Bredy airstrip
09-05-03	G-FXBT	A22 Foxbat	U/c collapsed following
	forced landing at Mapperton Farm,nr Wimborne		
11-08-03	G-CHYL	R-22 Beta	Damaged in heavy landing at Bournemouth
24-8-03	G-BYPT	Rans S-6ES Coyote	Nosewheel collapsed after bounce
	on landing Compton Abbas.		
25-10-03	N999MH	C195	Slight damage after ground collision
	with G-AYEV at Compton Abbas		
20-11-03	G-BSZU	C150,	forced landing nr Warham,no casualties.
	Aircraft returned to Hurn by road 25th Nov.		
03-03-04	G-PWER	A-109	Cr 1 mile east of Bournemouth airport
	inbound BIA from Battersea. 2 on board killed.		
10-03-04	G-CBBF	Beech 76	U/c collapsed landing at Bournemouth.No cas
15-02-05	G-ALIW	Tiger Moth	Right u/c collapsed landing Littlebredy
08-07-05	G-LITZ	Pitts S1E	Groundloop landing Buckland Newton
29-04-06	G-BWEV	C152	Nosewheel collapse Compton Abbas
07-04-07	G-APXY	C150	Nosewheel collapse landing Compton Abbas
15-04-07	G-OBFC	Pa-28	cr landing at Henstridge.w/o.no cas.

AAIR searchable database

The following database entries have been searched for using 'North Sea' and 'Channel criteria':

Channel

Date	Aircraft Type	Serial Number	Location
450106	B-17F (WW)	42-30120	{49.08N-03.16W}
440219	C-47A	43-30717	Isle of Man/ off SE tip
440422	P-47D	43-25586	Ordfordness/ 20mi off
440503	P-38J	42-68187	Clacton/ offshore nr
440507	P-38J	42-68095	15mi off coast
440512	B-26B	42-96190*	Isle of Wight
440520	P-47D	42-76314	
440520	P-47D	42-76269	
440520	P-47D	42-76259	Dunkirk/8mi W {VH 1286}
440610	A-20G	43-9712	
440617	B-26B	42-96132	Friston/ 1mi S
440627	P-47D	42-74714	10mi from French Coast
430816	B-17F	42-3213	English coast/ 4mi off
430922	P-47C	41-6411	Manston/ 25mi E
450106	B-24H	41-29575	Harwich/ off shore
450206	P-51D10	44-14383	Puckpool, Isle of Wight
450223	B-24J	42-110160	Comer/ 15mi E
450228	B-17G	44-8255	
450304	C-46D	44-77654	Humber River area
450309	B-17G	43-38302	
450323	B-17G	44-8754	
450324	P-51D15	44-15139	Lowestoft/ 18mi E
450414	B-17G	42-37840	Isle of Man/Pearlwick Bay
450423	B-17G	43-38856	Isle of Man, 2mi S Ramsey
450611	B-17G	43-37971	Gurnsey Is
450614	P-51B7	43-6686W	Orfordness/ 10mi E
450614	P-51		Orfordness/ 10mi E
440702	P-47D	42-76523	Isle of Wight/SW tip

440723	P-47C	41-6234W	Nevin/ 1mi offshore
440723	P-38J	42-67456	Isle of Wight
440723	P-38J	42-67943	Isle of Wight/1mi Brading
440730	B-26B	41-31904	St Catherines Pnt/10mi S
440801	A-20G	43-9887	Isle of Wight
440811	P-51B	43-12212W*	Scarborough/ 7mi N
440824	C-47A	42-100636	Lands End/off
440825	B-26B	42-95797	Brest/off
440825	B-26B	42-95802	Brest/off
440904	P-38J	43-28414	Omaha Beach/off
441108	B-17G	44-8418	
441108	B-17G	42-38064	
441127	P-51D10	44-14204	French coast/30mi from
441212	P-51D15	44-15230	Manston/ 20mi E
441231	P-51D10	44-14171	Bradwell Bay

North Sea

Date	Aircraft Type	Serial Number	Location
440429	P-51B15	42-106828	Ipswich/ 30mi E
430805	B-17F	42-30468	Berwick/nr
431117	P-47D	42-8614	Happisburgh/ 10mi E
450210	P-51B	43-6755W	Felixstowe/ offshore
450302	B-17G	44-8697	
450302	B-17G	43-37767	
450331	B-24H	42-50331	Orkney Is/Kirkland
450404	B-17G	43-38210	
450404	B-17G	43-38639	
450409	B-17G	44-8798	
450507	B-17G	44-8640	
450526	B-17G	43-38333	
440816	B-24H	41-28981	
440816	B-24H	42-50580	
441015	B-24H	41-29408	
441101	P-51D5	44-13784	Orfordness/ 4mi S
421020	Spitfire	BN-193	North Sea

APPENDIX V: LUFTWAFFE RECORDED LOSSES JULY-SEPTEMBER 1940

The following list has been compiled from Luftwaffe loss records. Location information given in the records is general and therefore all loss locations that could have resulted in a crash site on the seabed (i.e. maritime, coastal or unknown) have been included. It is representative of one particular period of very intense air conflict (the Battle of Britain) over the English Channel and South-East England and is therefore not typical of German losses during WWII.

Date	Type	Aircraft details	Location	Cause
10/07/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: -; Unit: Luftflotte 2, III./Z. G. 26?	Near Folkestone	Shot down
10/07/1940	Bf109	Aircraft type: Bf 109 E3; Registration number: -; Unit: Luftflotte II./J. G. 51	Thames estuary	Air battle
10/07/1940	He59	Aircraft type: He 59; Registration number: -; Unit: Luftflotte 2, Seenotflug-Kdo. 1 (Air rescue commando 1)	Channel	Shot down
11/07/1940	Do17	Aircraft type: Do 17 P; Registration number: -; Unit: Luftflotte 3, 2. (F)/11	Unknown	Unknown
11/07/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, I./K. G. 51	Unknown	Unknown
11/07/1940	He111	Aircraft type: He 111 H; Registration number: -; Unit: Luftflotte 3, I./K. G. 55	Unknown	Unknown
11/07/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, II./L. G. 1	Unknown	Unknown
11/07/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, III./Z. G. 76	Unknown	Unknown
11/07/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, III./Z.G. 76	Unknown	Unknown
11/07/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, III./Z. G. 76	Unknown	Unknown
11/07/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, III./Z. G. 76	Unknown	Unknown
11/07/1940	Ju87	Aircraft type: Ju 87; Registration number: -; Unit: Luftflotte 3, III./St. G. 2	Unknown	Unknown
11/07/1940	He59	Aircraft type: He 59; Registration number: -; Unit: Seenotflug-Kde. 1 (Air rescue commando 1)	Channel	Shot down
12/07/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, St. St./K. G. 55	Unknown	Unknown
12/07/1940	He111	Aircraft type: He 111 H3; Registration number: -; Unit: Luftflotte 5, 5./K. G. 26	Aberdeen	Shot down (probably)
13/07/1940	Do17	Aircraft type: Do 17 P; Registration number: -; Unit: Luftflotte 3, 2.(F)/123	Unknown	Unknown
13/07/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, II./K. G. 32	Unknown	Unknown
13/07/1940	Bf109	Aircraft type: Bf 109; Registration number: -; Unit: Luftflotte 2, III./J. G. 51	Channel	Air battle
14/07/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 2, II./L. G. 1	Near Dover	Shot down
14/07/1940	Unknown	Aircraft type:; Registration number:; Unit: Luftflotte		
14/07/1940	Unknown	Aircraft type:; Registration number:; Unit: Luftflotte		
15/07/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte II./L. G. 1	Unknown	Unknown
15/07/1940	He111	Aircraft type: He 111 H3; Registration number: -; Unit: Luftflotte 5, 2./K. G. 26	Scottish coast	Unknown
16/07/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, HH./K. G. 54	Unknown	Air battle
16/07/1940	He111	Aircraft type: He 111 H3; Registration number: -; Unit: Luftflotte 3, III./K. G. 26	Unknown	Unknown
17/07/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, I./K. G. 51	Channel	Shot down
17/07/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, 9./J. G. 51	Folkestone	Air battle

17/07/1940	He111	Aircraft type: He 111 D; Registration number: -; Unit: Luftflotte 3, Stab/K. G. 27	Unknown	Unknown
18/07/1940	Do17	Aircraft type: Do 17 M; Registration number: -; Unit: Luftflotte 3, Stab/St. G. 77	Unknown	Unknown
18/07/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, I./K. G. 54	Unknown	Unknown
18/07/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, II./L. G. 1	Unknown	Unknown
18/07/1940	Bf109	Aircraft type: Bf 109 E3; Registration number: -; Unit: Luftflotte 3, II./J. G. 2	Unknown	Unknown
13 or 19/7/40	Ju88	Aircraft type: Ju 88; Registration number: -; Unit: Luftflotte 2, 4.(F)/122	Unknown	Unknown
13 or 19/7/40	Fw200	Aircraft type: Fw 200; Registration number: -; Unit: Luftflotte 2, I./K. G. 40	Unknown	Unknown
19/07/1940	Do17	Aircraft type: Do 17 P; Registration number: -; Unit: Luftflotte 3, 4. (fd)/121	Unknown	Unknown
19/07/1940	He111	Aircraft type: He 111 P; Registration number:-; Unit: Luftflotte 3, III./K. G. 55	Unknown	Unknown
20/07/1940	Bf109	Aircraft type: Bf 109 E3; Registration number: -; Unit: Luftflotte 2, II./J. G. 51	Unknown	Shot down
20/07/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 3, I./J. G. 27	Unknown	Unknown
20/07/1940	Bf109	Aircraft type: Bf 109 E3; Registration number: -; Unit: Luftflotte I./J. G. 27	Unknown	Unknown
20/07/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, I./J. G. 27	Unknown	Unknown
20/07/1940	Do17	Aircraft type: Do 17 P; Registration number: -; Unit: Luftflotte 1. (F)/120	Unknown	Shot down (probably)
20/07/1940	He59	Aircraft type: He 59; Registration number: -; Unit: Luftflotte 3, Seenotflug-Kdo. I (Air rescue commando I)	Unknown	Unknown
21/07/1940	Bf109	Aircraft type: Bf 109; Registration number: -; Unit: Luftflotte 3, III./J. G. 77	Grid square 95?09	Unknown
21/07/1940	Do17	Aircraft type: Do 17 M; Registration number: -; Unit: Luftflotte 3, 4.(f)/14	Unknown	Unknown
21/07/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 4. (F)/14	Unknown	Unknown
21/07/1940	Do17	Aircraft type: Do 17; Registration number: -; Unit: 1./606	Scottish coast	Air battle
21/07/1940	Do18	Aircraft type: Do 18; Registration number: -; Unit: 1./406	Grid square 2697	Air battle
21/07/1940	Ju87	Aircraft type: Ju 87 E; Registration number: -; Unit: Luftflotte 2, II./St. G. 1	Channel	Shot down
21/07/1940	Ju87	Aircraft type: Ju 87 E; Registration number: -; Unit: Luftflotte 2, II./St. G. 1	Channel	Shot down
21/07/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, III./J. G. 27	Isle of Wight	Collision
22/07/1940	Do17	Aircraft type: Do 17 P; Registration number: -; Unit: Luftflotte 3, 4. (f)/121	Unknown	Unknown
22/07/1940		Aircraft type:; Registration number:; Unit: Luftflotte		
23/07/1940	Ju88	Aircraft type: Ju 88; Registration number: -; Unit: Luftflotte 2, 4. (F)/122	Near Dover	Unknown
23/07/1940	Fw200	Aircraft type: Fw 200; Registration number: -; Unit: Luftflotte 2, 2./K. G. 40	Unknown	Unknown
23/07/1940	Do17	Aircraft type: Do 17 Z; Registration number: -; Unit: Luftflotte 2, 2./K. G. 3	Over the sea	Ditched
24/07/1940	Bf109	Aircraft type: Bf 109; Registration number: -; Unit: Luftflotte 2, III./J. G. 52	Margate	Unknown
24/07/1940	Bf109	Aircraft type: Bf 109 E; Registration number: -; Unit: Luftflotte 2, 8./J. G. 32; pilot parachuted out	Dover-Calais	Unknown
24/07/1940	Bf109	Aircraft type: Bf 109 E; Registration number: -; Unit: Luftflotte 2, 7./J. G. 52	Margate	Unknown
24/07/1940	Bf109	Aircraft type: Bf 109 E; Registration number: -; Unit: Luftflotte 2, 7./J. G. 52	Margate	Unknown
24/07/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, I./L. G. 1	Unknown	Unknown
24/07/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, III./J. G. 26	Channel	Shot down

24/07/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, III./J. G. 26	Unknown	Shot down
25/07/1940	He111	Aircraft type: He 111 H3; Registration number: -; Unit: Rettererkundungsstaffel 1 (Air rescue reconnaissance 1)	Orkney	Unknown
25/07/1940	He111	Aircraft type: He 111 H4; Registration number: -; Unit: Luftflotte 2, 1./K. G. 4	Bristol channel	Unknown
25/07/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, II./K. G. 51	Unknown	Unknown
25/07/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, III./J. G. 27	Unknown	Unknown
25/07/1940	Bf109	Aircraft type: Bf 109; Registration number: -; Unit: Luftflotte 2, 7./J. G. 52	Dover	Unknown
25/07/1940	Do17	Aircraft type: Do 17 M; Registration number: -; Unit: Luftflotte 3, III./St.g. 1	Unknown	Unknown
25/07/1940	Bf109	Aircraft type: Bf 109 E; Registration number: -; Unit: Luftflotte 2, 7./J. G. 52	Dover	Unknown
25/07/1940	Bf109	Aircraft type: Bf 109 E; Registration number: -; Unit: Luftflotte 2, III./J. G. 52	Dover	Unknown
25/07/1940	Bf109	Aircraft type: Bf 109 E; Registration number: -; Unit: Luftflotte 4./J. G. 52	Dover	Unknown
25/07/1940	Bf110	Aircraft type: Bf 110; Registration number: -; Unit: Luftflotte 2, Erprobungsgruppe 210	Near Harwich	Shot down
25/07/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 2, III./J. G. 26	Channel	Shot down
25 or 26/7/40	Bf109	Aircraft type: Bf 109 E3; Registration number: -; Unit: Luftflotte 3, I./J. G. 27	Unknown	Unknown
27/07/1940	He111	Aircraft type: He 111 H2; Registration number: -; Unit: Luftflotte 2, III./K. G. 53	Unknown	Unknown
27/07/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, I./K. G. 51	Unknown	Unknown
27/07/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, I./St. G. 77	Unknown	Unknown
28/07/1940	He111	Aircraft type: He 111 H2; Registration number: -; Unit: Luftflotte 2, I./K. G. 53	Unknown	Unknown
28/07/1940	He111	Aircraft type: He 111 H2; Registration number: -; Unit: Luftflotte 2, I./K. G. 53	Unknown	Unknown
28/07/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 2, 9./K. G. 4	Unknown	Unknown
28/07/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, I./J. G. 52	Wissant	Air battle
28/07/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 2, I./J. G. 52	Near Dover	Shot down
28/07/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 2, II./L. G. 1	Near Dover	Shot down
28/07/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 2, II./L. G. 1	Dover	Shot down
28/07/1940	He59	Aircraft type: He 59; Registration number: -; Unit: Seenotflug-Kdo. 3 (Air rescue commando 3)	Over the sea	Shot down
28/07/1940	He59	Aircraft type: He 59; Registration number: -; Unit: Seenotflug-Kdo. 3 (Air rescue commando 3)	Channel	Shot down
29/07/1940	He111	Aircraft type: He 111 P?; Registration number: -; Unit: Luftflotte 3, III./K. G. 35	Unknown	Unknown
29/07/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, II./L. G. 1?	Unknown	Unknown
29/07/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 2, 4./K. G. 76	Channel	Unknown
29/07/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte I./K. G. 4	Near English coast	Unknown
29/07/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 2, II./St. G. 1	Channel	Ditched
29/07/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 2, 1./Erprobungs-?r. 210	Near Harwich	Shot down
30/07/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, II./K. G. 27	Unknown	Unknown
01/08/1940	He115	Aircraft type: He 115 C; Registration number: -; Unit: 3./506	Unknown	Unknown

01/08/1940	He115	Aircraft type: He 115; Registration number: -; Unit: 3./506	Unknown	Unknown
01/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 2, 9./K. G. 4	East coast England	Air battle
01/08/1940	Hs126	Aircraft type: Hs 126; Registration number: -; Unit: Luftflotte 2, 4. (K)/31	Unknown	Unknown
01/08/1940	He59	Aircraft type: He 59; Registration number: -; Unit: Sea rescue centre Cherbourg	Channel	Unknown
02/08/1940	He115	Aircraft type: He 115; Registration number: -; Unit: Luftflotte 5, 3./506	Unknown	Unknown
03/08/1940	Do17	Aircraft type: Do 17 P; Registration number: -; Unit: Luftflotte 3, 3. (P)/14	Unknown	Unknown
03/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: III./K. G. 55	Unknown	Unknown
03/08/1940	Do17	Aircraft type: Do 17 Z; Registration number: -; Unit: Luftflotte 2, 7./K. G. 3	Unknown	Unknown
04/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, 1./J. G. 54	Channel	Shot down
04/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, 1./J. G. 51	Channel	Shot down
5 or 15/8/40	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 2, II?./L. G. 1	Thames estuary	Shot down
5 or 15/8/40	Do17	Aircraft type: Do 17 Z; Registration number: -; Unit: Luftflotte 2, 9./K.G. 4	Folkestone	Air battle
07/08/1940	Ju88	Aircraft type: Ju 88 A2; Registration number: -; Unit: Luftflotte 3, 1. (F)/121	Unknown	Unknown
07/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 5, 1. (F)/121	Unknown	Unknown
08/08/1940	He111	Aircraft type: He 111 H4; Registration number: -; Unit: Luftflotte 2, I./K.G. 4	Irish Sea	Unknown
08/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, III./J. G. 26	Channel	Shot down
08/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 3, I./J.G. 27; pilot parachuted out	Isle of Wight	Shot down
08/08/1940	Bf109	Aircraft type: Bf 109 E3; Registration number: -; Unit: Luftflotte 3, I./J. G. 27	Unknown	Unknown
08/08/1940	Bf109	Aircraft type: Bf 109 E3; Registration number: -; Unit: Luftflotte 3, I./J. G. 27	Unknown	Unknown
08/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, II./J. G. 27; pilot parachuted out	Isle of Wight	Shot down
08/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 3, II./J. G. 27	Isle of Wight	Shot down
08/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, II./J. G. 27	Unknown	Unknown
08/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, II./J. G. 27	Unknown	Unknown
08/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, II./J. G. 27; pilot parachuted out	Isle of Wight	Shot down
08/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, I./St. G. 3	Unknown	Unknown
08/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, I./St. G. 3	Unknown	Unknown
08/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, I./St. G. 3	Unknown	Unknown
08/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, III./St. G. 2	Unknown	Shot down
08/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, II./St. G. 1	Unknown	Shot down
08/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, III./St. G. 1?	Unknown	Unknown
08/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, III./St. G. 1?	Unknown	Unknown
08/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, II./St.G. 77	Unknown	Unknown
08/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, II./St.G. 77	Unknown	Unknown

08/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, II./St.G. 77	Unknown	Unknown
08/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, 7./L.G. 1	Channel	Shot down
08/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, III./J. G. 27	Unknown	Unknown
08/08/1940	Bf109	Aircraft type: Bf 109; Registration number: -; Unit: Luftflotte 2, III./J. G. 26	Margate	Shot down
09/08/1940	He111	Aircraft type: He 111 H4; Registration number: -; Unit: Luftflotte 2, 2./K.G. 4	Flamborough Head	Shot down
09/08/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, ?./L. G. 2	Unknown	Unknown
09/08/1940	He111	Aircraft type: He 111 H3; Registration number: -; Unit: Luftflotte 3, 7./K. G. 26; crew has been taken as POW	Northeast coast England	Air battle
09/08/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, III./K.G. 54	Plymouth	Unknown
11/08/1940	Bf110	Aircraft type: Bf 110 C6; Registration number: -; Unit: Luftflotte 2, Erpr.?? Gruppe 210	Harwich	Air battle
11/08/1940	Bf110	Aircraft type: Bf 110 C6; Registration number: -; Unit: Luftflotte 2, Erpr.?? Gruppe 210	Harwich	Air battle
11/08/1940	Bf110	Aircraft type: Bf 110 C?; Registration number: -; Unit: Luftflotte 2, 2./K. G. 26	Thames estuary	Air battle
11/08/1940	Bf109	Aircraft type: Bf 109 E3; Registration number: -; Unit: Luftflotte 2, 3./J. G. 31	Channel	Unknown
11/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 2, III./K. G. 54	Thames estuary	Air battle
11/08/1940	Bf110	Aircraft type: Bf 110; Registration number: -; Unit: Luftflotte 2, 3./K. G. 26	Thames estuary	Shot down
11/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 2, II./St. G. 1	Thames estuary	Air battle
11/08/1940	He111	Aircraft type: He 111 H3; Registration number: -; Unit: Luftflotte 3, II./K. G. 27	Unknown	Unknown
11/08/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, I./K.G. 54	Unknown	Unknown
11/08/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, I./K.G. 54	Channel	Shot down
11/08/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, II./K.G. 54	Unknown	Unknown
11/08/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, II./K.G. 54	Unknown	Unknown
11/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 3, II./J. G. 27	Unknown	Unknown
11/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 3, I./J.G. 27; pilot parachuted out	Channel	Shot down
11/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, III./J. G. 27	Unknown	Unknown
11/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, I./K. G. 2	Portland	Shot down
11/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, I./K. G. 2	Unknown	Unknown
11/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, I./K. G. 2	Unknown	Unknown
11/08/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: -; Unit: Luftflotte 3, I./K. G. 2	Unknown	Unknown
11/08/1940	Bf110	Aircraft type: Bf 110 C??; Registration number: -; Unit: Luftflotte 3, II./K. G. 2	Unknown	Unknown
11/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, I./J. G. 2	Unknown	Shot down
11/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, I./J. G. 2	Unknown	Unknown
11/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, III./J. G. 2	Unknown	Unknown
11/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, II./J. G. 2	Unknown	Shot down
11/08/1940	Bf109	Aircraft type: Bf 109 E3; Registration number: -; Unit: Luftflotte 3, III./J. G. 2	Unknown	Shot down

11/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftwaffe 3, III./J. G. 2	Unknown	Unknown
11/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 3, III./J. G. 2	Unknown	Unknown
11/08/1940	He59	Aircraft type: He 59; Registration number: -; Unit: Luftflotte Sea rescue centre Cherbourg	Channel	Unknown
11/08/1940	He59	Aircraft type: He 59; Registration number: -; Unit: Luftflotte Sea rescue centre Cherbourg	Channel	Unknown
11/08/1940	Ju88	Aircraft type: Ju 88; Registration number: -; Unit: Luftflotte 3, II./K. G. 54	Portland	Unknown
12/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 2, 3./J. G. 3	Margate	Air battle
12/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 2, 3./J. G. 3	Margate	Air battle
12/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, III./J. G. 54	Channel	Shot down
12/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, III./J. G. 54	Channel	Shot down
12/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, I./J. G. 26	Folkestone	Air battle
12/08/1940	Bf109	Aircraft type: Bf 109 E2; Registration number: -; Unit: Luftflotte 2,II./J. G. 51	Hastings	Unknown
12/08/1940	Bf109	Aircraft type: Bf 109 E3; Registration number: -; Unit: Luftflotte 2, II./J. G. 51	Hastings	Unknown
12/08/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, Stab/K. G. 51	Unknown	Unknown
12/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, I./K. G. 51	Unknown	Unknown
12/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, I./K. G. 51	Unknown	Unknown
12/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, I./K. G. 51	Unknown	Unknown
12/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, II./K. G. 51	Unknown	Unknown
12/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, III./K. G. 51	Unknown	Unknown
12/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, III./K. G. 51	Unknown	Unknown
12/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, III./K. G. 51	Unknown	Unknown
12/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, III./K. G. 51	Unknown	Unknown
12/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, III./K. G. 51	Unknown	Unknown
12/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, III./J. G. 53	Unknown	Unknown
12/08/1940	Bf110	Aircraft type: Bf 110 C2; Registration number: -; Unit: Luftflotte 3, III./K. G. 76	Unknown	Unknown
12/08/1940	Bf110	Aircraft type: Bf 110 D; Registration number: -; Unit: Luftflotte 3, I./K. G. 2	Unknown	Unknown
12/08/1940	Bf110	Aircraft type: Bf 110 C2; Registration number: -; Unit: Luftflotte 3, II./K. G. 2	Unknown	Unknown
12/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, I./K. G. 2	Unknown	Unknown
12/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, III./J. G. 53	Portland	Shot down
12/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, III./J. G. 53	Portland	Shot down
13/08/1940	Do17	Aircraft type: Do 17 Z; Registration number: -; Unit: Luftflotte 2, 7./K. G. 2	Eastchurch	Shot down
13/08/1940	Do17	Aircraft type: Do 17 Z; Registration number: -; Unit: Luftflotte 2, 7./K. G. 2	Eastchurch	Shot down
13/08/1940	Do17	Aircraft type: Do 17 Z; Registration number: -; Unit: Luftflotte 2, 7./K. G. 2	Eastchurch	Shot down
13/08/1940	Do17	Aircraft type: Do 17 Z; Registration number: -; Unit: Luftflotte 2, 8./K. G. 2	Eastchurch	Air battle

13/08/1940	Do17	Aircraft type: Do 17 Z; Registration number: -; Unit: Luftflotte 2, 7./K. G. 2	Eastchurch	Unknown
13/08/1940	Do17	Aircraft type: Do 17 Z; Registration number: -; Unit: Luftflotte 2, Stab/K.G. 2	Thames estuary	Air battle
13/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, II./J. G. 26	Folkestone	Air battle
13/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 2, 3.?/K.G. 26	Thames estuary	Unknown
13/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, III./K. G. 1	Unknown	Unknown
13/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, III./K. G. 1	Unknown	Unknown
13/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, II./K. G. 54	Unknown	Shot down
13/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, II./K. G. 54	Unknown	Shot down
13/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, I./K. G. 54	Unknown	Shot down
13/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, I./K. G. 54	Unknown	Shot down
13/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 3, II./J. G. 53	Unknown	Shot down
13/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 3, II./J. G. 53	Unknown	Shot down
13/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, II./J. G. 53	Unknown	Shot down
13/08/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: -; Unit: Luftflotte 3, I./K.G. 2	Unknown	Unknown
13/08/1940	Bf110	Aircraft type: Bf 110 D; Registration number: -; Unit: Luftflotte 3, V./L. G. 1	Unknown	Unknown
13/08/1940	Bf110	Aircraft type: Bf 110 D; Registration number: -; Unit: Luftflotte 3, V./L. G. 1	Unknown	Unknown
13/08/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: -; Unit: Luftflotte 3,V./L. G. 1	Unknown	Unknown
13/08/1940	Bf110	Aircraft type: Bf 110 D; Registration number: -; Unit: Luftflotte 3, VI./K. G. 1	Unknown	Unknown
13/08/1940	Bf110	Aircraft type: Bf 110 D; Registration number: -; Unit: Luftflotte 3, V./L. G. 1	Unknown	Unknown
13/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, III./Z. G. 76	Unknown	Unknown
13/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, III./Z. G. 76	Unknown	Unknown
13/08/1940	Ju87	Aircraft type: Ju 87 R; Registration number: -; Unit: Luftflotte 3, II./St. G. 2	Channel	Shot down
13/08/1940	Ju87	Aircraft type: Ju 87 R; Registration number: -; Unit: Luftflotte 3, II./St. G. 2	Unknown	Unknown
13/08/1940	Ju87	Aircraft type: Ju 87 R; Registration number: -; Unit: Luftflotte 3, II./St. G. 2	Unknown	Unknown
13/08/1940	Ju87	Aircraft type: Ju 87 R; Registration number: -; Unit: Luftflotte 3, II./St. G. 2	Unknown	Unknown
13/08/1940	Ju87	Aircraft type: Ju 87 R; Registration number: -; Unit: Luftflotte 3, II./St. G. 2	Unknown	Unknown
13/08/1940	Ju87	Aircraft type: Ju 87 R; Registration number: -; Unit: Luftflotte 3, II./St. G. 2	Channel	Shot down
13/08/1940	Ju87	Aircraft type: Ju 87 R; Registration number: -; Unit: Luftflotte 3, II./St. G. 2	Unknown	Unknown
13/08/1940	Ju87	Aircraft type: Ju 87 R; Registration number: -; Unit: Luftflotte 3, II./St. G. 2	Unknown	Unknown
13/08/1940	Ju87	Aircraft type: Ju 87 R; Registration number: -; Unit: Luftflotte 3, II./St. G. 2	Unknown	Unknown
13/08/1940	Ju87	Aircraft type: Ju 87 R; Registration number: -; Unit: Luftflotte 3, II./St. G. 2	Unknown	Unknown
13/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, III./K. G. 27	Channel north of Cherbourg	Air battle
14/08/1940	Bf110	Aircraft type: Bf 110 D; Registration number: -; Unit: Luftflotte 2, Erprobungsgruppe 210	Ramsgate	Shot down

14/08/1940	Bf110	Aircraft type: Bf 110 D; Registration number: -; Unit: Luftflotte 2, Erprobungsgruppe 210	Ramsgate	Shot down
14/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 2, 10./L. G. 1	Folkestone	Air battle
14/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, I./L. G. 1	Unknown	Unknown
14/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, St.st./K. G. 55	Unknown	Unknown
14/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, I./L. G. 1	Unknown	Unknown
14/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, III./K. G. 27	Unknown	Unknown
14/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, III./K. G. 27	Unknown	Unknown
14/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, III./K. G. 27	Unknown	Unknown
14/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, III./K. G. 27	Unknown	Unknown
14/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, III./K. G. 27	Unknown	Unknown
14/08/1940	Bf109	Aircraft type: Bf 109 E; Registration number: -; Unit: Luftflotte 2, III./J. G. 3	Channel	Unknown
14/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 2, I./J. G. 26	Dover	Shot down
14/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, III./K. G. 27	Unknown	Unknown
14/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, III./K. G. 27	Unknown	Unknown
14/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, III./K. G. 27	Unknown	Unknown
14/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, III./K. G. 27	Unknown	Unknown
14/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, III./K. G. 27	Unknown	Unknown
14/08/1940	Bf109	Aircraft type: Bf 109 E; Registration number: -; Unit: Luftflotte 2, III./J. G. 3	Channel	Unknown
14/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 2, I./J. G. 26	Dover	Shot down
14/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 2, 4./J. G. 3	Dover	Unknown
14/08/1940	Bf109	Aircraft type: Bf 109 E; Registration number: -; Unit: Luftflotte 2, 6./J. G. 51	Thames estuary	Air battle
15/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 2, 10./L. G. 1	Folkestone	Unknown
15/08/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, II./L. G. 1	Unknown	Shot down
15/08/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, II./L. G. 1	Unknown	Shot down
15/08/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, II./L. G. 1	Unknown	Shot down
15/08/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, II./L. G. 1	Unknown	Shot down
15/08/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, II./L. G. 1	Unknown	Shot down
15/08/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 3, II./L. G. 1	Unknown	Shot down
15/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, II./L. G. 1	Unknown	Unknown
15/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, I./L. G. 1; crew rescued by sea rescue service	Channel	Shot down
15/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, III./Z. G. 76	Unknown	Unknown
15/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, III./Z. G. 76	Unknown	Shot down
15/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, III./Z. G. 76	Unknown	Shot down

15/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, III./Z. G. 76	Unknown	Shot down
15/08/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: -; Unit: Luftflotte 3, II./Z. G. 76	Unknown	Shot down
15/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, II./Z. G. 76	Unknown	Shot down
15/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, II./Z. G. 76	Unknown	Shot down
15/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, II./Z. G. 76	Unknown	Shot down
15/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, II./Z. G. 76	Unknown	Shot down
15/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, II./Z. G. 76	Unknown	Shot down
15/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, II./Z. G. 76	Channel	Shot down
15/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, Stab/L.? G. 76	Unknown	Shot down
15/08/1940	Do17	Aircraft type: Do 17 P; Registration number: -; Unit: Luftflotte 3, 3. (F)/22	15 west 2970	Unknown
15/08/1940	Ar196	Aircraft type: Ar 196; Registration number: -; Unit: 1./196	Channel	Shot down
15/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, III./Z. G. 76	Unknown	Unknown
15/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, III./Z. G. 76	Unknown	Unknown
15/08/1940	Do17	Aircraft type: Do 17 Z2; Registration number: -; Unit: Luftflotte 2, 6./K. G. 3	Thames estuary	Unknown
15/08/1940	Do17	Aircraft type: Do 17 Z2; Registration number: -; Unit: Luftflotte 2, 6./K. G. 3	Thames estuary	Unknown
15/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, 5./J. G. 51	Unknown	Unknown
15/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 2, 10./L. G. 1	Folkestone	Unknown
15/08/1940	He111	Aircraft type: He 111 H2; Registration number: -; Unit: Luftflotte 2, II./K. G. 53	Channel	Emergency watering after air battle
15/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, ?./J. G. 54	Channel	Air battle
15/08/1940	Ju88	Aircraft type: Ju 88 C; Registration number: -; Unit: Luftflotte 5, I./K. G. 50	Unknown	Unknown
15/08/1940	Ju88	Aircraft type: Ju 88 C; Registration number: -; Unit: Luftflotte 5, I./K. G. 50	Unknown	Unknown
15/08/1940	Ju88	Aircraft type: Ju 88 C; Registration number: -; Unit: Luftflotte 5, III./K. G. 50	Unknown	Unknown
15/08/1940	Ju88	Aircraft type: Ju 88 C; Registration number: -; Unit: Luftflotte 5, III./K. G. 50	Unknown	Unknown
15/08/1940	Ju88	Aircraft type: Ju 88 C; Registration number: -; Unit: Luftflotte 5, III./K. G. 50	Unknown	Unknown
15/08/1940	He115	Aircraft type: He 115 C; Registration number: -; Unit: Luftflotte 5, 1./506	Montrose	Unknown
15/08/1940	Bf110	Aircraft type: Bf 110 D?; Registration number: -; Unit: Luftflotte 3, II./Z. G. 2	Unknown	Shot down
15/08/1940	Ju87	Aircraft type: Ju 87 R; Registration number: -; Unit: Luftflotte 3, II./St. G. 2	Unknown	Unknown
15/08/1940	Ju87	Aircraft type: Ju 87 R?; Registration number: -; Unit: Luftflotte 3, II./St. G. 2	Unknown	Unknown
15/08/1940	Ju88	Aircraft type: Ju 88 R; Registration number: -; Unit: Luftflotte 3, II.?/St.G. 1	Unknown	Unknown
15/08/1940	Ju87	Aircraft type: Ju 87 R?; Registration number: -; Unit: Luftflotte 3, II./St. G. 2	Channel	Shot down
15/08/1940	Do17	Aircraft type: Do 17 P; Registration number: -; Unit: Luftflotte 3, 3. (P)/31	Unknown	Unknown
15/08/1940	He59	Aircraft type: He 59; Registration number: -; Unit: Sea rescue commando 4	Grid square 6997	Shot down

15/08/1940	Do24	Aircraft type: Do 24; Registration number: -; Unit: Sea rescue commando 4	Grid square 6997	Ditched when landing in rough sea
15/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 2, 5. (F)/122	Rochester	Unknown
16/08/1940	Do17	Aircraft type: Do 17 Z2; Registration number: -; Unit: Luftflotte 2, 7./K. G. 76	Gravesend	Collision
16/08/1940	He111	Aircraft type: He 111 H4; Registration number: -; Unit: Luftflotte 2, 3./K. G. 126	H?ull	Shot down
16/08/1940	Bf109	Aircraft type: Bf 109 E3?; Registration number: -; Unit: Luftflotte 2, 4./J. G. 51	Unknown	Unknown
16/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 2, 4./J. G. 51	Unknown	Unknown
16/08/1940	Bf109	Aircraft type: Bf 109; Registration number: -; Unit: Luftflotte 2, 3./J. G. 54	Channel	Unknown
16/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, II./J. G. 26	Dover	Unknown
16/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, II./K. G. 55	Unknown	Unknown
16/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, II./K. G. 55	Unknown	Unknown
16/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, III./K. G. 55	Unknown	Unknown
16/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, II./J. G. 53	Channel	Shot down
16/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, II./J. G. 53	Isle of Wight	Shot down
16/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, I./J. G. 53	Unknown	Unknown
16/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, I./St. G. 2	Unknown	Unknown
16/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, I./St. G. 2	Unknown	Unknown
16/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, I./St. G. 2	Unknown	Unknown
16/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, I./St. G. 2	Unknown	Unknown
16/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, I./St. G. 2	Unknown	Shot down
16/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, III./St. G. 2	Unknown	Unknown
16/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, III./St. G. 2	Unknown	Unknown
16/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, III./St. G. 2	Unknown	Unknown
16/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, III./St. G. 2	Unknown	Unknown
16/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, I./K. G. 27	Isle of Wight	Shot down
16/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 2, 2./Z. G. 26	Southeast coast England	Unknown
16/08/1940	He111	Aircraft type: He 111 H3; Registration number: -; Unit: Luftflotte 2, 2./K. G. 1	Unknown	Unknown
18/08/1940	Do17	Aircraft type: Do 17 Z; Registration number: -; Unit: Luftflotte 2, 8./K.G. 76	Unknown	Unknown
18/08/1940	Do17	Aircraft type: Do 17 Z2; Registration number: -; Unit: Luftflotte 2, 9./K. G. 76	Channel	Unknown
18/08/1940	Do17	Aircraft type: Do 17 Z2; Registration number: -; Unit: Luftflotte 2, 7./K. G. 76	Unknown	Unknown
18/08/1940	He111	Aircraft type: He 111 H2; Registration number: -; Unit: Luftflotte 2, III./K.G. 53	Thames estuary	Shot down
18/08/1940	He111	Aircraft type: He 111 ; Registration number: -; Unit: Luftflotte 2, III./K. G. 53	Thames estuary	Shot down
18/08/1940	He111	Aircraft type: He 11 H2; Registration number: -; Unit: Luftflotte 2, III./K. G. 53	Thames estuary	Shot down

18/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 2, 5./Z. G. 26	Unknown	Unknown
18/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 2, 6./Z. G. 26	Unknown	Unknown
18/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 2, 6./Z. G. 26	Unknown	Unknown
18/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 2, 6./Z. G. 26	Unknown	Unknown
18/08/1940	Bf110	Aircraft type: Bf 110 B; Registration number: -; Unit: Luftflotte 2, 7. (f)/K. G. 2	Unknown	Unknown
18/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, II./K. G. 27	Unknown	Unknown
18/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, II./J. G. 27	Unknown	Unknown
18/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, II./J. G. 27	Unknown	Unknown
18/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 2, I. J. G. 27	Unknown	Unknown
18/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, I./J. G. 27	Unknown	Unknown
18/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, I./J. G. 27	Unknown	Unknown
18/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, II./J. G. 27; pilot rescued by sea rescue service	Isle of Wight	Shot down
18/08/1940	Ju87	Aircraft type: Ju 87 B1; Registration number: -; Unit: Luftflotte 2, I./St. G. 77	Channel	Unknown
18/08/1940	Ju87	Aircraft type: Ju 87 B1; Registration number: -; Unit: Luftflotte 2, I./St. G. 77	Channel	Shot down
18/08/1940	Ju87	Aircraft type: Ju 87 B1; Registration number: -; Unit: Luftflotte 2, I./St. G. 77	Channel	Shot down
18/08/1940	Ju87	Aircraft type: Ju 87 B1; Registration number: -; Unit: Luftflotte 2, I./St. G. 77	Channel	Unknown
18/08/1940	Ju87	Aircraft type: Ju 87 B1; Registration number: -; Unit: Luftflotte 2, I./St. G. 77	Channel	Unknown
18/08/1940	Ju87	Aircraft type: Ju 87 E1; Registration number: -; Unit: Luftflotte 2, I./St. G. 77	Channel	Unknown
18/08/1940	Ju87	Aircraft type: Ju 87 E1; Registration number: -; Unit: Luftflotte 2, I./St. G. 77	Channel	Unknown
18/08/1940	Ju87	Aircraft type: Ju 87 B1; Registration number: -; Unit: Luftflotte 3, I./St. G. 77	Channel	Unknown
18/08/1940	Ju87	Aircraft type: Ju 87 B1; Registration number: -; Unit: Luftflotte 3, I./St. G. 77	Channel	Unknown
18/08/1940	Ju87	Aircraft type: Ju 87 B1; Registration number: -; Unit: Luftflotte 3, I./St. G. 77	Channel	Unknown
18/08/1940	He111	Aircraft type: He 111 H3; Registration number: -; Unit: Luftflotte 2, II./K. G. 53	Unknown	Unknown
18/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, II./K. G. 27	Unknown	Unknown
18/08/1940	Bf109	Aircraft type: Bf 109 E3; Registration number: -; Unit: Luftflotte 2, 3./J. G. 51	Unknown	Unknown
18/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, 6.?/J. G. 3	Unknown	Unknown
18/08/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: -; Unit: Luftflotte 2, 3./Z. G. 26	Southeast coast England	Unknown
18/08/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: -; Unit: Luftflotte 2, I./K. G. 26	Thames estuary	Unknown
18/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 2, 4./Z. G. 26	Unknown	Unknown
18/08/1940	Bf110	Aircraft type: Bf 110 D/O; Registration number: -; Unit: Luftflotte 2, 3./K. G. 26	Southeast coast England	Unknown
18/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 2, 4./Z. G. 26	Unknown	Unknown
18/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 2, 4./Z. G. 26	Unknown	Unknown

18/08/1940	Bf110	Aircraft type: Bf 110 C2; Registration number: -; Unit: Luftflotte 2, 1./K.G. 26	Unknown	Unknown
18/08/1940	Ju87	Aircraft type: Ju 87 B1; Registration number: -; Unit: Luftflotte 3, I./St. G. 77	Unknown	Unknown
18/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, II./J. G. 2?	Isle of Wight	Shot down
18/08/1940	Ju87	Aircraft type: Ju 87 B1; Registration number: -; Unit: Luftflotte 3, II./St. G. 77	Unknown	Unknown
18/08/1940	Ju87	Aircraft type: Ju 87 B1; Registration number: -; Unit: Luftflotte 3, II./St. G. 77	Channel	Shot down
18/08/1940	Ju87	Aircraft type: Ju 87 B1; Registration number: -; Unit: Luftflotte 3, II./St. G. 77	Unknown	Unknown
18/08/1940	Ju87	Aircraft type: Ju 87 B; Registration number: -; Unit: Luftflotte 3, III./St. G. 77	Littlehampton	Shot down
18/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, 2./J. G. 3	Unknown	Air battle
19/08/1940	Do17	Aircraft type: Do 17 Z; Registration number: -; Unit: Luftflotte 2, I./K. G. 2	Unknown	Unknown
19/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, III./K. G. 27	Liverpool	Unknown
19/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, III./K. G. 51	Unknown	Unknown
19/08/1940	Do17	Aircraft type: Do 17 Z; Registration number: -; Unit: Luftflotte 2, I./K. G. 2	Unknown	Unknown
20/08/1940	Do17	Aircraft type: Do 17 Z3; Registration number: -; Unit: Luftflotte 2, 9./K. G. 3	Eastchurch	Shot down
20/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, 1./J. G. 52	Unknown	Unknown
20/08/1940	Bf110	Aircraft type: Bf 110 D; Registration number: -; Unit: Luftflotte 2, 2./Erpr.gruppe 210	Aldeburgh	Unknown
21/08/1940	Do17	Aircraft type: Do 17 Z; Registration number: -; Unit: Luftflotte 2, 8./K.G. 2	Unknown	Unknown
21/08/1940	Do17	Aircraft type: Do 17 Z2; Registration number: -; Unit: Luftflotte 2, 6./K. G. 3	Unknown	Unknown
21/08/1940	Do17	Aircraft type: Do 17 Z3; Registration number: -; Unit: Luftflotte 2, 6./K. G. 3	Unknown	Unknown
21/08/1940	Do17	Aircraft type: Do 17 Z3; Registration number: -; Unit: Luftflotte 2, 4./K. G. 3	Unknown	Unknown
21/08/1940	He111	Aircraft type: He 111 H2; Registration number: -; Unit: Luftflotte 2, III./K.G. 53	Unknown	Unknown
21/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, Kampfgr. 806	Unknown	Unknown
21/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, Kampfgr. 806	Unknown	Unknown
21/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, I. K. G. 54	Unknown	Unknown
21/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, II. K. G. 54	Unknown	Unknown
21/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, II. K. G. 54	Unknown	Unknown
21/08/1940	Do17	Aircraft type: Do 17 Z3; Registration number: -; Unit: Luftflotte 2, 2./K. G. 2	Unknown	Unknown
21/08/1940	Do17	Aircraft type: Do 17 Z3; Registration number: -; Unit: Luftflotte 2. 6./K. G. 3	Unknown	Unknown
22/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, 3. (F)/121	Unknown	Unknown
22/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, III./L. G. 2	Unknown	Unknown
23/08/1940	Do17	Aircraft type: Do 17?; Registration number: -; Unit: Luftflotte 2, St. St./K. G. 2	Grid square 123	Unknown
23/08/1940	He111	Aircraft type: He 111 H3; Registration number: -; Unit: Wettererkundungsstaffel 1 (Weather reconnaissance unit 1)	Orkneys	Shot down
24/08/1940	Ju88	Aircraft type: Ju 88; Registration number: -; Unit: Luftflotte 2, 5. (F)/122	Unknown	Unknown

24/08/1940	Ju88	Aircraft type: Ju 88; Registration number: -; Unit: Luftflotte 2, Stab II./K.G. 76	Manston	Shot down
24/08/1940	Ju88	Aircraft type: Ju 88; Registration number: -; Unit: Luftflotte 2, Stab II./K.G. 76	Manston	Shot down
24/08/1940	Ju88	Aircraft type: Ju 88; Registration number: -; Unit: Luftflotte 2, 4./K. G. 76	Manston	Shot down
24/08/1940	Ju88	Aircraft type: Ju 88 A; Registration number: -; Unit: Luftflotte 2, 4./K. G. 76	Manston	Shot down
24/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, 8./J. G. 51	Near Ramsgate	Unknown
24/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 2, 8./J. G. 51	Near Ramsgate	Unknown
24/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, 1./J. G. 51?	Channel	Collision
24/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 2, 5./J. G. 51	Boulogne	Shot down
24/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 2, 9./J. G. 51	Channel	Air battle
24/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 2, I./L. G. 2	Unknown	Unknown
24/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, 7./J. G. 3	Unknown	Shot down
24/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, I. K. G. 51	Unknown	Shot down
24/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, III./K. G. 55	Unknown	Unknown
24/08/1940	Bf110	Aircraft type: Bf 110; Registration number: -; Unit: Aufkl.Gr.d.Ob.d.L. (Reconnaissance unit)	Sheerness	Unknown
24/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, II./J. G. 2	Isle of Wight	Air battle
25/08/1940	Do17	Aircraft type: Do 17; Registration number: -; Unit: Luftflotte 2, 3./K. G. 76; crew parachuted out and was rescued	Dover-Calais	Shot down
25/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, I./J. G. 54	Near Dover	Shot down
25/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: -; Unit: Luftflotte 3, II./K. G. 51	Unknown	Unknown
25/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, II./J. G. 53	Unknown	Unknown
25/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, II./J. G. 53	Unknown	Unknown
25/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, II./J. G. 53; crew rescued by searescue service	Channel	Shot down
25/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 3, I./J. G. 55	Unknown	Unknown
25/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 3, III./J. G. 2	Unknown	Air battle
25/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 3, III./J. G. 2	Unknown	Air battle
25/08/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: -; Unit: Luftflotte 3, III./Z. G. 76	Unknown	Unknown
25/08/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: -; Unit: Luftflotte 3, I./Z. G. 2	Unknown	Unknown
25/08/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: -; Unit: Luftflotte 3, I./Z. G. 2	Unknown	Unknown
25/08/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: -; Unit: Luftflotte 3, I./Z. G. 2	Unknown	Unknown
25/08/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: -; Unit: Luftflotte 3, I./Z. G. 2	Unknown	Unknown
25/08/1940	Bf110	Aircraft type: Bf 110 C2; Registration number: -; Unit: Luftflotte 3, V./L. G. 1	Unknown	Unknown
25/08/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: -; Unit: Luftflotte 3, V./L. G. 1	Unknown	Unknown
26/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 3, II./J. G. 2?	Unknown	Unknown

26/08/1940	Bf109	Aircraft type: Bf 109; Registration number: -; Unit: Luftflotte 3, II./J. G. 2?	Unknown	Unknown
26/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, III./J. G. 27	Isle of Wight	Collision
26/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 3, III./J. G. 27	Cherbourg	Shot down
26/08/1940	Bf110	Aircraft type: Bf 110; Registration number: -; Unit: Luftflotte 3, III./K. G. 76	Unknown	Unknown
26/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, III./Z. G. 76; crew rescued by air rescue service	Channel	Shot down
26/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, III./Z. G. 76	Unknown	Unknown
26/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, II./Z. G. 76	Unknown	Unknown
26/08/1940	Bf110	Aircraft type: Bf 110 C; Registration number: -; Unit: Luftflotte 3, II./Z. G. 2	Unknown	Unknown
26/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 2, I./ J. G. 52	Near Ramsgate	Shot down
26/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 2, 1./J. G. 52	Near Folkestone	Shot down
26/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 2, I./ J. G. 52	Near Dover	Shot down
26/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 2, I./ J. G. 52	Near Ramsgate	Shot down
26/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 2, I./ J. G. 52	Near Ramsgate	Shot down
26/08/1940	Bf110	Aircraft type: Bf 110 D/O; Registration number: -; Unit: Luftflotte 2, 4./Z. G. 26	Unknown	Unknown
26/08/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: -; Unit: Luftflotte 2, 9./Z. G. 26	Unknown	Unknown
26/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, I./K. G. 55	Unknown	Unknown
26/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, II./K. G. 55	Unknown	Unknown
26/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, II./K. G. 55; crew rescued	Channel	Shot down
26/08/1940	He111	Aircraft type: He 111 P; Registration number: -; Unit: Luftflotte 3, II./K. G. 55	Unknown	Unknown
26/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, I./J. G. 53	Near Porthamuth (= Portsmouth?)	Ditched because of broken engine
26/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: -; Unit: Luftflotte 3, II./J. G. 53	Channel	Shot down
26/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: -; Unit: Luftflotte 3, III./J. G. 27	Unknown	Unknown
26/08/1940	Do17	Aircraft type: Do 17 Z3; Registration number: -; Unit: Luftflotte 2, 7./K. G. 3	Ramsgate	Shot down
26/08/1940	Do17	Aircraft type: Do 17 Z2; Registration number: -; Unit: Luftflotte 2, 7./K. G. 3	Ramsgate	Shot down
26/08/1940	Bf109	Aircraft type: Bf 109E4; Registration number: -; Unit: Luftflotte 2, 6./J. G. 3	Thames estuary	Shot down
26/08/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: -; Unit: Luftflotte 2, 9./Z. G. 26	Unknown	Unknown
26/08/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 3103; Unit: Luftflotte 5, 6./K. G. 30	Unknown	Unknown
26/08/1940	Do17	Aircraft type: Do 17 Z2; Registration number: 3329 5K+C?; Unit: Luftflotte 2, 7./K. G. 3	Channel	Unknown
27/08/1940	He111	Aircraft type: He 111 H2; Registration number: -; Unit: Luftflotte 2, Stab III./K. G. 1	Unknown	Unknown
27/08/1940	Ju88	Aircraft type: Ju 88 A5; Registration number: -; Unit: Luftflotte 2, 7./K. G. 4	Unknown	Unknown
27/08/1940	Do17	Aircraft type: Do 17 P; Registration number: -; Unit: Luftflotte 3, 3. (F)/31	Unknown	Unknown
28/08/1940	Do17	Aircraft type: Do 17 Z2; Registration number: 3378; Unit: Luftflotte 2, 3./K. G. 3	Unknown	Unknown

28/08/1940	Do17	Aircraft type: Do17 Z3; Registration number: 4151; Unit: Luftflotte 2,6./K. G. 3	Unknown	Shot down
28/08/1940	Do17	Aircraft type: Do 17 Z2; Registration number: 3225; Unit: Luftflotte 2, 4./K. G. 3	Unknown	Shot down
28/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 3553; Unit: Luftflotte 2,7. J. G. 3;crew rescued by sea rescue service	Channel	Shot down
28/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1436; Unit: Luftflotte 2, I./J. G. 51	Channel	Shot down
28/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5395; Unit: Luftflotte 2, Stab/J. G. 51	Unknown	Unknown
28/08/1940	He59	Aircraft type: He 59; Registration number: 1528; Unit: Luftflotte 2, Seenotflug-Kdo. 3 (Sea rescue commando 3)	Grid square 1116	Shot down
28/08/1940	He59	Aircraft type: He 59; Registration number: 1512; Unit: Luftflotte 2, Seenotflug-Kdo. 3 (Sea rescue commando 3)	Grid square 1285	Shot down
28/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5383; Unit: Luftflotte 3, I./J. G. 2	Unknown	Unknown
28/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 3702; Unit: Luftflotte 3,III./J. G. 2	Unknown	Unknown
28/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 4204; Unit: Luftflotte 2, I./J. G. 54	Dungeness	Shot down
28/08/1940	Bf109	Aircraft type: Bf 109 E3; Registration number: 2759; Unit: Luftflotte 2, II./J. G. 54	Dover-Calais	Shot down
28/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1449; Unit: Luftflotte 2, II./J. G. 3	Channel	Shot down
29/08/1940	He115	Aircraft type: He 115; Registration number: 3263 M2+LL; Unit: 3./106	Grid square 3376	Probably engine damage
29/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5364; Unit: Luftflotte 2, 4./J. G. 3	Hastings	Air battle
29/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1134; Unit: Luftflotte 2, 4./J. G.3	Hastings	Air battle
29/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1181; Unit: Luftflotte 2, I./J. G. 26	Channel	Air battle
29/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 3634; Unit: Luftflotte 2, I./J. G. 26	Channel	Air battle
29/08/1940		Aircraft type: ; Registration number: -; Unit: Luftflotte		
30/08/1940	Do215	Aircraft type: Do 215; Registration number: 0036 G2+JH; Unit: 4./Aufkl.Gr. Ob.d.L. (Reconnaissance group)	Norwich	Unknown
30/08/1940	Do17	Aircraft type: Do 17 P; Registration number: 1119 4N+A1; Unit: Luftflotte 5, 3. (F)/22	Scotland	Unknown
30/08/1940	He111	Aircraft type: He 111 H2; Registration number: 2720 V4+BV; Unit: Luftflotte 2, 5./K. G. 1	Unknown	Unknown
30/08/1940	He111	Aircraft type: He 111 H2; Registration number: 5444 V4+GV; Unit: Luftflotte 2, 5./K. G. 1	Unknown	Unknown
30/08/1940	He111	Aircraft type: He 111 H2; Registration number: 5125 V4+HV; Unit: Luftflotte 2, 5./K. G. 1	Unknown	Unknown
30/08/1940	He111	Aircraft type: He 111 H2; Registration number: 3305 V4+MV; Unit: Luftflotte 2, 5./K. G. 1	Unknown	Unknown
30/08/1940	He111	Aircraft type: He 111 H?; Registration number: 2750 V4+DW; Unit: Luftflotte 2,6./K. G. 1	Unknown	Unknown
30/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 804; Unit: Luftflotte 2, II./J. G. 26	Folkestone	Shot down
30/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 3350; Unit: Luftflotte 2, 7./J.? G. 52	Dover	Engine damage
30/08/1940	He111	Aircraft type: He 111 H; Registration number: 3438; Unit: Luftflotte 3,III./K. G. 27	Unknown	Unknown
30/08/1940	Bf110	Aircraft type: Bf 110 C2; Registration number: 3496 U3+KG; Unit: Luftflotte 2, 6./Z. G. 26	Unknown	Unknown
30/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 2782; Unit: Luftflotte 3, III./J. G. 2	Rungense (= Dungeness?)	Shot down
30/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 2765; Unit: Luftflotte 3, II./J. G. 2	Unknown	Unknown
30/08/1940	Bf110	Aircraft type: Bf 110 BO?; Registration number: 3315 A2+HK; Unit: Luftflotte 3, II./Z. G. 2	Unknown	Unknown
30/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1623; Unit: Luftflotte 2, II./J. G. 27	Near Dunheness (= Dungeness?)	Shot down

31/08/1940	Do17	Aircraft type: Do 17 Z3; Registration number: 3414 5K+GN; Unit: Luftflotte 2, II./K. G. 3	Unknown	Unknown
31/08/1940	Do17	Aircraft type: Do 17 Z2; Registration number: 3264 5K+KM; Unit: Luftflotte 2, II./K. G. 3	Unknown	Unknown
31/08/1940	Do17	Aircraft type: Do 17 Z3; Registration number: 2669 5K+LM; Unit: Luftflotte 2,II./K. G. 3	Unknown	Unknown
31/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 3712; Unit: Luftflotte 2, III./J. G. 26	Channel	Ditched
31/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 4866; Unit: Luftflotte 2, I./J. G. 26	Dugeners (= Dungeness?)	Shot down
31/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 3464; Unit: Luftflotte 2, III./J. G. 26	Unknown	Unknown
31/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5339; Unit: Luftflotte 2, I./J. G. 3	Unknown	Unknown
31/08/1940	Bf109	Aircraft type: Bf 109 E1?; Registration number: 1082; Unit: Luftflotte 2, I./J. G. 3	Unknown	Unknown
31/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 6092; Unit: Luftflotte 2, 1./J. G. 77	Unknown	Unknown
31/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 5908; Unit: Luftflotte 2, 3./J. G. 77; crew rescued by sea rescue service	Channel	Shot down
31/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 3652; Unit: Luftflotte 2, 1./J. G. 77	Channel	Shot down
31/08/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5105; Unit: Luftflotte 2, 2./J. G. 77	Channel	Shot down
31/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 4076; Unit: Luftflotte 2, 2./J. G. 77	Channel	Shot down
31/08/1940	Bf110	Aircraft type: Bf 110 D?; Registration number: 3396 3U+HS; Unit: Luftflotte 2, 8./Z. G. 26	Unknown	Unknown
31/08/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 3510; Unit: Luftflotte 3, II./J. G. 2	Unknown	Air battle
01/09/1940	Do17	Aircraft type: Do 17 Z; Registration number: 3369 5K+HT; Unit: Luftflotte 2, 9./K. G. 76	Unknown	Unknown
01/09/1940	Bf110	Aircraft type: Bf 110 D; Registration number: 3303 L1+BK; Unit: Luftflotte 2, II./L. G. 1	Sputh coast England	Air battle
01/09/1940	Bf110	Aircraft type: Bf 110 C2; Registration number: 3541 L1+CK; Unit: Luftflotte 2, II./L. G. 1	South coast England	Air battle
01/09/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: 2212 L1+FL; Unit: Luftflotte 2, II./L. G. 1	East coast England	Air battle
02/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1574; Unit: Luftflotte 2, Stab III./J. G. 54	Unknown	Unknown
02/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 3714; Unit: Luftflotte 2, 1./J. G. 51	Channel	Unknown (salvaged by maritime rescue service)
02/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1632; Unit: Luftflotte 2, 2./J. G. 51	Channel	Unknown (salvaged by maritime rescue service)
02/09/1940	Bf109	Aircraft type: Bf 109; Registration number: 6276; Unit: Luftflotte 3, I./J. G. 53	Unknown	Unknown
02/09/1940	Bf109	Aircraft type: Bf 109; Registration number: 3584; Unit: Luftflotte 3, I./J. G. 53	Unknown	Unknown
02/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1167; Unit: Luftflotte 3, I./J. G. 53	Unknown	Unknown
02/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1569; Unit: Luftflotte 3, I./J. G. 53	Dover-Calais	Shot down (rescued by maritime rescue service)
02/09/1940	Bf110	Aircraft type: Bf 110 DO; Registration number: 3197; Unit: Luftflotte 3, II./Z. G. 2	Unknown	Unknown
02/09/1940	Bf110	Aircraft type: Bf 110 DO; Registration number: 3269; Unit: Luftflotte 3, ?./Z. G. 2	Unknown	Unknown
02/09/1940	Bf109	Aircraft type: Bf 109; Registration number: 6276; Unit: Luftflotte 3, I./J. G. 53	Unknown	Unknown

02/09/1940	Bf109	Aircraft type: Bf 109; Registration number: 3584; Unit: Luftflotte 3, I./J. G. 53	Unknown	Unknown
02/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1167; Unit: Luftflotte 3, I./J. G. 53	Unknown	Unknown
02/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1569; Unit: Luftflotte 3, I.J. G. 53; crew salvaged by maritime rescue service	Dover-Calais	Shot down
02/09/1940	Bf110	Aircraft type: Bf 110 DO; Registration number: 3197; Unit: Luftflotte 3, I./Z. G. 2	Unknown	Unknown
02/09/1940	Bf110	Aircraft type: Bf 110 DO; Registration number: 3269; Unit: Luftflotte ?./Z. G. 2	Unknown	Unknown
02/09/1940	Do18	Aircraft type: Do 18; Registration number: 868 K6+DL; Unit: 3./406; Crew salvaged by maritime rescue service	Grid square 8229	Shot down
02/09/1940	Bf110	Aircraft type: Bf 110 D1; Registration number: 3536 3U+GN; Unit: Luftflotte 2, 2./Z. G. 26	Thames estuary	Unknown
02/09/1940	Ju88	Aircraft type: Ju 88; Registration number: 276 F6+DK; Unit: Luftflotte 2, 2. (F)/ 122	Unknown	Unknown
03/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 823; Unit: Luftflotte 2, Stab II./J. J. 26	Margate	Unknown
03/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 6290; Unit: Luftflotte 2, 9./J. G. 51	Channel	Shot down
03/09/1940	Bf110	Aircraft type: Bf 110 C2; Registration number: 3225 3U+KR; Unit: Luftflotte 2, 7./Z. G. 26	Unknown	Unknown
04/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5807; Unit: Luftflotte 2, I./J. G. 77	Channel	Shot down
04/09/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: 2116 3K+A?A; Unit: Luftflotte 2, Stab Z. G. 2	Unknown	Unknown
04/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5026; Unit: Luftflotte 2, 3./J. G. 54	Unknown	Unknown
04/09/1940	Bf110	Aircraft type: Bf 110 DO; Registration number: 3390 B?9+AB; Unit: Luftflotte 2, Krpr. Gr. 210	Litlehampdon (=Littlehampton?)	Air battle
04/09/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: 2104 2N+KP; Unit: Luftflotte 3, III./Z. G. 76	Unknown	Unknown
04/09/1940	Bf110	Aircraft type:Bf 110 C4; Registration number: 3101 2N+CN; Unit: Luftflotte 3, III./Z. G. 76	Unknown	Unknown
04/09/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: 3545 2N+AC; Unit: Luftflotte 3, III./Z. G. 76	Unknown	Unknown
04/09/1940	Bf110	Aircraft type: Bf 110 D; Registration number: 3306 L1+FK; Unit: Luftflotte 2, 14.?/L. G. 2	South coast England	Air battle
04/09/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: 3563 2N+HM; Unit: Luftflotte 3, III./Z. G. 76	Unknown	Unknown
04/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 2678; Unit: Luftflotte 3, II./J. G. 2	Unknown	Unknown
04/09/1940	He111	Aircraft type: He 111 H3; Registration number: 6896; Unit: Luftflotte 5, II./K. G. 26	East coast England	Unknown
04/09/1940	He111	Aircraft type: He 111 H4; Registration number: 3287; Unit: Luftflotte 5, 4./ K. G. 26	East coast England	Unknown
05/09/1940	He111	Aircraft type: He 111 H3; Registration number: 3338 A1+CR; Unit: Luftflotte 2, III./K.G. 55?	Unknown	Unknown
05/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5291; Unit: Luftflotte 2, Stab. III./J.G. 54	Unknown	Unknown
05/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5284; Unit: Luftflotte 2, 9./J.G. 54	Unknown	Unknown
05/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 5375; Unit: Luftflotte 3, Stab J. G. 53	Unknown	Unknown
05/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1098; Unit: Luftflotte 2, II./J. G. 54; crew salvaged by maritime rescue service	Thames estuary	Shot down
05/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5353; Unit: Luftflotte 2, II./J. G. 54	Southend	Shot down
05/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1096; Unit: Luftflotte 2, I./J. G. 54	Unknown	Unknown
05/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 730; Unit: Luftflotte 2, 3./J. G. 3	Unknown	Unknown
05/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 148?0; Unit: Luftflotte 2, II./J. G. 3	Unknown	Unknown

05/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1949; Unit: Luftflotte 2, 1./J. G. 52	Folkstone	Shot down
05/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1464; Unit: Luftflotte 2, 5./J. G. 3	Channel	Shot down
05/09/1940	Bf109	Aircraft type: Bf 109E4; Registration number: 5342; Unit: Luftflotte 2, 2./J. G. 3	Unknown	Accident, plane touched water
05/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1985; Unit: Luftflotte 2, 1./J. G. 3	Unknown	Unknown
06/09/1940	He111	Aircraft type: He 111 P; Registration number: 3065 5J+JP; Unit: Luftflotte 2, 6./K. G. 4	Grid square 8271	Unknown
06/09/1940	He111	Aircraft type: He 111 H3; Registration number: 3324 W4+1B; Unit: Luftflotte 2, Stab I./K.G. 2	Unknown	Unknown
06/09/1940	Ju88	Aircraft type: Ju 88; Registration number: 3176 F1+LP; Unit: Luftflotte 2, 6./K. G. 76	Littlestone (= Littlestone-on-sea)	Air battle
06/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 3225; Unit: Luftflotte 2, 3./J. G.27	Thames estuary	Shot down
06/09/1940	Bf109	Aircraft type: Bf 109; Registration number: 1580 (?); Unit: Luftflotte 2, III./J. G. 27	Tilbury	Air battle
06/09/1940	Bf109	Aircraft type: Bf 109; Registration number: 63?18; Unit: Luftflotte 2, 7./J. G. 27	Tilbury	Air battle
06/09/1940	Bf109	Aircraft type: Bf 109 E7; Registration number: 3736; Unit: Luftflotte 2, II./I.? G. 2	Hernsbay (= Herne Bay?)	Ditched
06/09/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: 2145; Unit: Luftflotte 2, Stab Z. G. 26	Unknown	Unknown
06/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5347; Unit: Luftflotte 3, I./J. G. 53	Hastings	Unknown
06/09/1940	He111	Aircraft type: He 111 H3; Registration number: 3258 1H+H?T; Unit: Luftflotte 5, 6./K. G. 26	Unknown	Unknown
07/09/1940	Do17	Aircraft type: Do 17 Z; Registration number: 2536 F1+BA; Unit: Luftflotte	Unknown	Unknown
07/09/1940	He111	Aircraft type: He 111 H2; Registration number: 2777 A1+DN; Unit: Luftflotte 2, II./K. G. 53	Unknown	Unknown
07/09/1940	He111	Aircraft type: He 111 H3; Registration number: 6912 A1+AB; Unit: Luftflotte 2, I./K. G. 53	Unknown	Unknown
07/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 2021; Unit: Luftflotte 2, 3./Krpr. Gr. 210	Southampton	Ditched
07/09/1940	He111	Aircraft type: He 111 P4; Registration number: 3078 5J+JP; Unit: Luftflotte 2, 6./K. G. 4	Unknown	Unknown
07/09/1940	He111	Aircraft type: He 111 H5; Registration number: 3515 1T+HH; Unit: Luftflotte 2, Stab K. G. 4?0	Unknown	Unknown
07/09/1940	Bf109	Aircraft type: Bf 109 E3; Registration number: 5091; Unit: Luftflotte 2, 3./J. G. 52	Unknown	Unknown
07/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 4840; Unit: Luftflotte 2, 2.?/J. G. 52	Unknown	Unknown
07/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 6342; Unit: Luftflotte 2, 2./J. G. 51	Unknown	Unknown
07/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5811; Unit: Luftflotte 2, 2./J. G. 77	Unknown	Unknown
07/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5129; Unit: Luftflotte 2, Stab I./J. G. 77; crew saved by maritime rescue service	Near Dungenes (= Dungeness?)	Shot down
07/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5249; Unit: Luftflotte 2, Stab III./J. G. ?3	Thames estuary	Shot down
07/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 6271; Unit: Luftflotte 2, 8./J. G. 3 ; crew rescued	Channel	Shot down
07/09/1940	Bf110	Aircraft type: Bf 110 DO; Registration number: 3185A2+BH; Unit: Luftflotte 2, II./Z. G. 2	Ramsgate	Air battle
07/09/1940	Bf110	Aircraft type: Bf 110 DO; Registration number: 3328 A2+FH; Unit: Luftflotte 2, II./Z. G. 2	Ramsgate	Air battle
07/09/1940	Bf110	Aircraft type: Bf 110 DO; Registration number: 3334 A2+NH; Unit: Luftflotte 2, II./Z. G.2	Ramsgate	Air battle
07/09/1940	Bf110	Aircraft type: Bf 110 C5; Registration number: 5F+1?? 2208; Unit: Luftflotte 3, 4. (F) / 14	Unknown	Unknown

07/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 6032 B?3+AM; Unit: Luftflotte 3, II./K. G. 5	Unknown	Unknown
07/09/1940	He115	Aircraft type: He 115; Registration number: 2724; Unit: 1./106	Grid square 6779	Shot down by Lockheed
07/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 3909; Unit: Luftflotte 3, I./J. G. 2	Unknown	Unknown
07/09/1940	Bf109	Aircraft type: Bf 109 S4; Registration number: 3320; Unit: Luftflotte 3,II./J. G. 2	Unknown	Unknown
07/09/1940	He59	Aircraft type: He 59; Registration number: 840 DA+WT; Unit: Air rescue service; crew was rescued	Grid square 1114	Ditched because of rough sea
07/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 5798; Unit: Luftflotte 2, 1./?. G. 2	Unknown	Unknown
08/09/1940	Bf109	Aircraft type: Bf 109 E7; Registration number: 1171; Unit: Luftflotte 2, III./J. G. 33	Channel	Collision
08/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 867; Unit: Luftflotte 3, I./J. G. 53	Unknown	Unknown
08/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 3478; Unit: Luftflotte 3, I./J. G. 53	Channel	Collision
09/09/1940	He111	Aircraft type: He 111 H3; Registration number: 5713 V4+BL; Unit: Luftflotte 2, 3,.K. G. 1	Unknown	Shot down
09/09/1940	He111	Aircraft type: He 111 H2; Registration number: 2630 A1+ZD; Unit: Luftflotte 2, III./K. G. 53	Unknown	Collision with Spitfire
09/09/1940	Bf109	Aircraft type: Bf109 E1; Registration number: 3488; Unit: Luftflotte 2, II./J. G. 27	Unknown	Unknown
09/09/1940	Bf109	Aircraft type: Bf 109; Registration number: 6139; Unit: Luftflotte 2, 8./J. G. 53	Unknown	Unknown
09/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 963; Unit: Luftflotte 2, 4./J. G. 53	Near Hastings	Shot down
09/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 3906; Unit: Luftflotte 2, 3./J. G. 54, crew rescued	Unknown	Unknown
09/09/1940	Bf109	Aircraft type: Bf 109E1; Registration number: 6103; Unit: Luftflotte 2, 1./J. G. 54	Unknown	Unknown
09/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 3488; Unit: Luftflotte 2, II./J. G. 27	Unknown	Unknown
09/09/1940	Bf110	Aircraft type: Bf 110 C; Registration number: 2137 2N+FM; Unit: Luftflotte 3, III./K. G. 76	Unknown	Unknown
09/09/1940	Bf110	Aircraft type: Bf 110 C; Registration number: 3207; Unit: Luftflotte 3, III./Z. G. 76	Unknown	Unknown
09/09/1940	Bf110	Aircraft type: Bf 110 C; Registration number: 3108 2N+EP; Unit: Luftflotte 3, III./Z. G. 76	Unknown	Unknown
10/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 4246 B3+D?F?; Unit: Luftflotte 3, II./K. G. 54	Unknown	Unknown
11/09/1940	He111	Aircraft type: He 111 H3; Registration number: 3215 Lh+JK; Unit: Luftflotte 2, 2./K. G. 26; most crew members were rescued by maritime rescue service	Channel	Shot down
11/09/1940	He111	Aircraft type: He 111 H5; Registration number: 3545? 1H+BC; Unit: Luftflotte 2, 5./K. G. 26	Unknown	Unknown
11/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 2641; Unit: Luftflotte 2, 2./J. G. 51	Unknown	Unknown
11/09/1940	Ju87	Aircraft type: Ju 87 B1; Registration number: 5162 S2+KP; Unit: Luftflotte 2, 2./St. G. 77	Unknown	Collision with Ju 87
11/09/1940	Ju87	Aircraft type: Ju 87 B1; Registration number: 5521 S2+JK; Unit: Luftflotte 2, 2./St. G. 77	Unknown	Collision with Ju 87
11/09/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: 3251 3U+LT; Unit: Luftflotte 2, 9./K. G. 26	Unknown	Unknown
11/09/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: 3576 ?2+?H; Unit: Luftflotte 3, I./K. G. 2	Unknown	Unknown
11/09/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: 3625 3U+HM; Unit: Luftflotte 2, Stab II./K. G. 26	Unknown	Unknown
11/09/1940	Bf110	Aircraft type: Bf 110 D2; Registration number: 34?? 3U+HP; Unit: Luftflotte 2, 6./K. G. 26	Unknown	Unknown
11/09/1940	Bf110	Aircraft type: Bf 110 D?; Registration number: 3392 3U+DK?; Unit: Luftflotte 2, 4./K. G. 26	Unknown	Unknown
11/09/1940	He111	Aircraft type: He 111 H3; Registration number: 56?6; Unit: Luftflotte 2, Stab?K. G.?	Unknown	Shot down

12/09/1940	Ju88	Aircraft type: Ju 88A1; Registration number: 310? F?6+??; Unit: Luftflotte 2, 1. (F)/122	Unknown	Unknown
12/09/1940	Do215			
13/09/1940	He111	Aircraft type: He 111 P; Registration number: 2670 1C?+DS; Unit: Luftflotte 3, III./K. G. 27	Unknown	Unknown
14/09/1940	He111	Aircraft type: He 111 K; Registration number: 5357 O?1+K.; Unit: Luftflotte 3, ?./K. G. 55	Unknown	Unknown
14/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 3854?; Unit: Luftflotte 2, I./J. G. 77	Unknown	Unknown
14/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 3759; Unit: Luftflotte 2, Stab I./J. G. 77	Unknown	Unknown
15/09/1940	Do17	Aircraft type: Do 17 Z; Registration number: 2651 F1+FL; Unit: Luftflotte 2, 3./K. G. 76	Unknown	Unknown
15/09/1940	Do17	Aircraft type: Do 17 Z; Registration number: 2555 F1+FS; Unit: Luftflotte 2, 8./K. G. 76	Unknown	Unknown
15/09/1940	Do17	Aircraft type: Do 17 Z; Registration number: 3405 U5+FT; Unit: Luftflotte 2, 9./K. G. 2	Channel	Shot down
15/09/1940	Do17	Aircraft type: Do 17 Z; Registration number: 3401 U5+DS; Unit: Luftflotte 2, 8./K. G. 2; most of the crew rescued by maritime rescue service	Channel	Shot down
15/09/1940	Do17	Aircraft type: Do 17 Z; Registration number: 2549 U5+FS; Unit: Luftflotte 2, 8./K. G. 2	Channel	Shot down
15/09/1940	Do17	Aircraft type: Do 17 Z 3; Registration number: 2304 U5+KN; Unit: Luftflotte 2, 5./K. G. 2	Channel	Shot down
15/09/1940	He111	Aircraft type: He 111 H4; Registration number: 6985 1H+JH; Unit: Luftflotte 2, I./K. G. 26	Unknown	Unknown
15/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 4802; Unit: Luftflotte 2, 3./J. G. 77	Dungenes (= Dungeness?)	Shot down
15/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5251; Unit: Luftflotte 2,III./J. G. 53; pilot was rescued	Channel	Emergency landing on sea because of lack of fuel
15/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 945; Unit: Luftflotte 2, 1./J. G. 3	Channel	Unknown
15/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 6147; Unit: Luftflotte 2, 2./J. G. 27	Unknown	Unknown
15/09/1940	Do17	Aircraft type: Do 17 Z; Registration number: 3230 U5+FT; Unit: Luftflotte 2, 9./K. G. 2	Channel	Shot down
15/09/1940	Do17	Aircraft type: Do 17 Z; Registration number: 3440 U5+PS; Unit: Luftflotte 2, 8./K. G. 2	Channel	Shot down
15/09/1940	Do17	Aircraft type: Do 17 Z; Registration number: 4245; Unit: Luftflotte 2, 8./K. G. 2; pilot rescued	Channel	Shot down
15/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 3071 9K+AH; Unit: Luftflotte 3, I./K. G. 51	Unknown	Unknown
15/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 9K+KM; Unit: Luftflotte II./K. G. 51	Unknown	Unknown
15/09/1940	He111	Aircraft type: He 111 P2; Registration number: 1586; Unit: Luftflotte 3, III./K. G. 55	Channel	Emergency landing on sea after air battle
15/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 3182; Unit: Luftflotte 2, Stab I./J. G. 52	Margate	Shot down
15/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 6160; Unit: Luftflotte 2, FlJ?. G. 53	Unknown	Unknown
15/09/1940	Do17	Aircraft type: Do 17 Z; Registration number: 3322 F1+DT; Unit: Luftflotte 2, 9./K. G. 76	Unknown	Unknown
15/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 3619; Unit: Luftflotte 2, 3./J. G. 53	Unknown	Unknown
15/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1345; Unit: Luftflotte 2, 1./J. G. 53	Unknown	Unknown
15/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5197; Unit: Luftflotte 2, 1./J. G. 53	Unknown	Unknown
15/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1606; Unit: Luftflotte 2, 2./J. G. 3	Unknown	Unknown
15/09/1940	Do17	Aircraft type: Do 17 Z; Registration number: 2578 F1+BS; Unit: Luftflotte 2, 8./K. G. 76	Unknown	Unknown

15/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 0226 B3+CP; Unit: Luftflotte 3, II./K. G. 54	Unknown	Unknown
15/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 2685; Unit: Luftflotte 2, 1./J. G. 3	Unknown	Unknown
15/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 1563; Unit: Luftflotte 2, I./J. G. 3; pilot rescued	Channel	Shot down
15/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1590; Unit: Luftflotte 2, 3./J. G. 53	Unknown	Unknown
15/09/1940	Do17	Aircraft type: Do 17 Z3; Registration number: 2678 U5+CN; Unit: Luftflotte 2, 5./K. G. 2	Channel	Shot down
16/09/1940	Do17	Aircraft type: Do 17 Z; Registration number: 2814 F1+AT; Unit: Luftflotte 2, 9./K. G. 76	Unknown	Unknown
16/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 3142 3Z+BS; Unit: Luftflotte 2, 8./K. G. 77	Unknown	Unknown
16/09/1940	Ju88	Aircraft type: Ju 88; Registration number: 374 F?6+HM; Unit: Luftflotte 2, 4. (F)/122	Grid square 146?	Unknown
16/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 7087 B3+HH; Unit: Luftflotte 3, I./K. G. 54	Unknown	Unknown
17/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 2126 5J+BS; Unit: Luftflotte 2, 8./K. G. 1	Unknown	Unknown
17/09/1940	He115	Aircraft type: He 115; Registration number: 2754 8L+GH; Unit: 1/906	East coast England	Unknown
17/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 3188 L1+XC; Unit: Luftflotte 3, II./L. G. 1	Unknown	Unknown
17/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 2152 B3+OL; Unit: Luftflotte 3, I./K. G. 54	Unknown	Unknown
18/09/1940	Ju88	Aircraft type: Ju 88; Registration number: 5100 3Z+HS; Unit: Luftflotte 2, 8./K. G. 77	Unknown	Unknown
18/09/1940	Ju88	Aircraft type: Ju 88; Registration number: 5097 3Z+ES; Unit: Luftflotte 2, 8./K. G. 77	Unknown	U
18/09/1940	Ju88	Aircraft type: Ju 88; Registration number: 3147 3Z+AS; Unit: Luftflotte 2, 8./K. G. 77	Unknown	Unknown
18/09/1940	Ju88	Aircraft type: Ju 88; Registration number: 3162 3Z+FS; Unit: Luftflotte 2, 8./K. G. 77	Unknown	Unknown
18/09/1940	Ju88	Aircraft type: Ju 88; Registration number: 3168 3Z+FT; Unit: Luftflotte 2, 9./K. G. 77	Near Tillburry (= Tillbury?)	Shot down
18/09/1940	Ju88	Aircraft type: Ju 88; Registration number: 5104 3Z+DT; Unit: Luftflotte 2, 9./K. G. 77	Near Tillburry (= Tillbury?)	Shot down
18/09/1940	Ju88	Aircraft type: Ju 88; Registration number: 3173 3Z+KD; Unit: Luftflotte 2, Stab III./K. G. 77	Unknown	Unknown
18/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 4842; Unit: Luftflotte 2, 4./J. G. 53	Near Dover	Shot down
18/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 6220; Unit: Luftflotte 2, 1./J. G. 54; crew rescued	Channel	Unknown
18/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 2669; Unit: Luftflotte 2, I./J. G. 77	Ramsgate	Shot down
19/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 6141 3Z+C?H; Unit: Luftflotte 2, 5.(F)/122	Flying in the direction of London	Unknown
19/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 2151 3Z+GH; Unit: Luftflotte 2, 1./K. G. 77	Flying in the direction of London	Unknown
19/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 4148 B3+HM; Unit: Luftflotte 3, II?./K. G. 54	Unknown	Unknown
19/09/1940	He111	Aircraft type: He 111 P2; Registration number: 2146 G1+GL; Unit: Luftflotte 3, I?./K. G. 55	Unknown	Unknown
19/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 362 7A+PM; Unit: Luftflotte 3, 4. (F)?321	Unknown	Unknown
20/09/1940	He111	Aircraft type: He 111 P; Registration number: 1683; Unit: Luftflotte 3, I./K. G. 27	Unknown	Unknown
21/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 3716; Unit: Luftflotte 2, 5./L. G. 2; Pilot rescued	Channel	Shot down
21/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 2088L1+AL; Unit: Luftflotte 3, I./L. G. 1	Unknown	Unknown
21/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 3079 N7+CH?; Unit: Luftflotte 3, 1./K. G. 806	Unknown	Unknown

22/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 352 7A+A?; Unit: Luftflotte3, 4.(F)/121	Unknown	Unknown
23/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1516; Unit: Luftflotte 2, 3./J. G. 54; pilot jumped out with parachute	Near Dover	Shot down
23/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 130 4U+CL; Unit: Luftflotte 3, 9. (F)/123	Unknown	Unknown
23/09/1940	Bf110	Aircraft type: Bf 110; Registration number: 2185 L2+ER; Unit: Luftflotte 2, 7.(F)/L.?G. 2	Unknown	Unknown
23/09/1940	He111	Aircraft type: He 111 H3; Registration number: 3322 1H+GP; Unit: Luftflotte 2, 6./K. G. 26	Unknown	Unknown
24/09/1940	He111	Aircraft type: He 111 H4; Registration number: 6964 1T+GH; Unit: Luftflotte 2, 1./K. Gr. 126	Unknown	Unknown
24/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 4144 9K+FR; Unit: Luftflotte 3, III./K. G. 51	Unknown	Unknown
24/09/1940	Bf110	Aircraft type: Bf 110 D/O; Registration number: 3384 S9+HH; Unit: Luftflotte 2, Krpr.? Gr. 21e?	Southampton	Air battle
24/09/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: 3534 2N+DN; Unit: Luftflotte 3, III./L. G. 76	Unknown	Unknown
25/09/1940	Bf109	Aircraft type: Bf 109 E7; Registration number: 5094; Unit: Luftflotte 2, 3./L. G. 2; pilot rescued	Channel	Air battle
25/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 6061; Unit: Luftflotte 2, 3./J. G. 27; pilot rescued	Channel	Air battle
25/09/1940	He111	Aircraft type: He 111 H2; Registration number: 5307 A1+HR; Unit: Luftflotte 2, 7./K. G. 53; crew rescued	Channel	Shot down
25/09/1940	He111	Aircraft type: He 111 H; Registration number: 6305 G1+BH; Unit: Luftflotte 3, I./K. G. 55	Unknown	Unknown
25/09/1940	He111	Aircraft type: He 111 H; Registration number: 2126 G1+DN; Unit: Luftflotte 3, II./K. G. 55	Unknown	Unknown
25/09/1940	He111	Aircraft type: He 111 H; Registration number: 1525 GO+KP; Unit: Luftflotte 3, II./K. G. 55	Unknown	Unknown
25/09/1940	He111	Aircraft type: He 111 H; Registration number: 2803 G1+ER?; Unit: Luftflotte 3, III./K.G. 55	Unknown	Unknown
25/09/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: 3591 3U+GS; Unit: Luftflotte 3, III./Z. G. 26	Unknown	Unknown
25/09/1940	Bf110	Aircraft type: Bf 110 C; Registration number: 3263; Unit: Luftflotte 3, III./Z. G. 26; crew rescued	Channel	Emergency landing on sea after air battle
26/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5369; Unit: Luftflotte 2, 3./J. G. 51	Dungenes (= Dungeness?)	Unknown
26/09/1940	Bf110	Aircraft type: Bf 110 C5; Registration number: 2187 57+CM; Unit: Luftflotte 3, 4.(F)/7?4	Unknown	Unknown
26/09/1940	He111	Aircraft type: He 111 H; Registration number: 5314 G1+BL; Unit: Luftflotte 3, ?./K. G. 55	Unknown	Unknown
26/09/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: 3094 3U+AR; Unit: Luftflotte 3, III./K. G. 26	Unknown	Unknown
26/09/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: 3028 U8+HH; Unit: Luftflotte 3, I./K. G. 26	Unknown	Unknown
26/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 3756; Unit: Luftflotte 2, I.?/J. G. 26; pilot rescued	Channel	Air battle
26/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 6273; Unit: Luftflotte 2, 3./J. G. 26	Hastings	Air battle
27/09/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: 2162 U8+FK; Unit: Luftflotte 3, I./Z. G.26	Unknown	Unknown
27/09/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: 3571 U8+CL; Unit: Luftflotte 3, I./Z. G. 26	Unknown	Unknown
27/09/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: 2168 3U+BD; Unit: Luftflotte 3, III./Z. G. 26	Unknown	Unknown
27/09/1940	Bf110	Aircraft type: Bf 110 C7; Registration number: 3629 3U+SM; Unit: Luftflotte 3, II./Z. G. 26	Unknown	Unknown
27/09/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: 3297 3U+FT; Unit: Luftflotte 3, III1/Z. G. 26	Unknown	Unknown
27/09/1940	Ju88	Aircraft type: Ju 88 A1; Registration number: 3934U+RL; Unit: Luftflotte 3, 5. (F)/123	Unknown	Unknown
28/09/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: 3290 3U+DS; Unit: Luftflotte 3, III1/Z. G. 26	Unknown	Unknown

27/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5333; Unit: Luftflotte 2, 5./J. G. 27; pilot rescued	Channel	Unknown
27/09/1940	Bf109	Aircraft type: Bf109 E1; Registration number: 1447; Unit: Luftflotte 2, 6./J. G. 27	Unknown	Unknown
27/09/1940	Bf109	Aircraft type: Bf 109; Registration number: 1538; Unit: Luftflotte 2, 6./J. G. 54	Tilbury	Air battle
27/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 3431; Unit: Luftflotte 2, 5./J. G. 52	Unknown	Unknown
27/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 3907; Unit: Luftflotte 2, II./J. G. 52	Chantham (= Chatham?)	Unknown
27/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5181; Unit: Luftflotte 2, 1.?/J. G. 52	Chatham	Unknown
27/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 6245; Unit: Luftflotte 2, 1.?/J. G. 52	Gravesend	Unknown
27/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 6162; Unit: Luftflotte 2, 6./J. G. 52	Channel	Unknown
27/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5340; Unit: Luftflotte 2, ?./J. G. 3	Channel	Air battle
27/09/1940	Ju88	Aircraft type: Ju 88 A5; Registration number: 4153L1+BR; Unit: Luftflotte 3, III./L. G. 1	Unknown	Unknown
27/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 3217; Unit: Luftflotte 2, 9./J. G. 3	Channel	Air battle
27/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 4872; Unit: Luftflotte 2, 9./J. G. 27; pilot rescued	Channel	Shot down
27/09/1940	Bf109	Aircraft type: Bf109 E4; Registration number: 4141; Unit: Luftflotte 2,6./J. G. 3; pilot rescued	Channel	Air battle
27/09/1940	Ju88	Aircraft type: Ju 88 A5; Registration number: 3197 L1+DR?; Unit: Luftflotte 3, III./L. G. 1	Unknown	Unknown
27/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 5165; Unit: Luftflotte 2, II./J. G. 54	Hastings	Unknown
28/09/1940	He111	Aircraft type: He 111 H3; Registration number: 5621 1H+EP; Unit: Luftflotte 2, II./K. G. 26	Unknown	Ditched
28?/9/40	Ju88	Aircraft type: Ju 88 A1; Registration number: 4071 5J+G8; Unit: Luftflotte 2, 8./K. G. 4	Unknown	Unknown
28/09/1940	Bf110	Aircraft type: Bf 110 C4; Registration number: 3290 3U+DS; Unit: Luftflotte 3, III1/Z. G. 26	Unknown	Unknown
29/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 3746; Unit: Luftflotte 2,2./J. G. 77	Unknown	Shot down
29/09/1940	Ju88	Aircraft type: Ju 88 A5; Registration number: 3135 L1+Ab; Unit: Luftflotte 3, Stab/L.G. 1; 3 men parachuted out	Unknown	Unknown
29/09/1940	He111	Aircraft type: He 111 P; Registration number: 2822 G1+DT; Unit: Luftflotte 3, III.?/K. G. 55	Unknown	Unknown
29/09/1940	He111	Aircraft type: He 111; Registration number: 5376 GT+M?A; Unit: Rescue Reconnaissance 2 (Rettererkundungsstaffel 2)	Unknown	Shot down
29?/9/40	Ju88	Aircraft type: Ju 88 A1; Registration number: 385 4U+MH; Unit: Luftflotte 3, ?./123	Unknown	Unknown
29?/9/40	Ju88	Aircraft type: Ju 88 A1; Registration number: 2063 9K+DH; Unit: Luftflotte 3, ?./K. G. 51	Unknown	Unknown
29?/9/40	He111	Aircraft type: He 111 P2; Registration number: 2836 G1+JA; Unit: Luftflotte 3, ?./K. G. 53;most of the crew were rescued	Channel	Emergency landing on sea after air battle
29?/9/40	He111	Aircraft type: He 111 P2; Registration number: 1616 G1+AL; Unit: Luftflotte 3, ?./K. G. 55	Unknown	Unknown
29?/9/40	Ju88	Aircraft type: Ju88 A1; Registration number: 7090; Unit: Luftflotte 3, ?./K.G. 54; crew rescued	Channel	Emergency landing on sea after air battle
29?/9/40	He111	Aircraft type: He 111 P2; Registration number: 1545 G1+AM; Unit: Luftflotte 3, ?./K.? G. 55	Unknown	Unknown
29?/9/40	He111	Aircraft type: He 111 P2; Registration number: 2643 G1+CM; Unit: Luftflotte 3, ?./K.? G. 55	Unknown	Unknown
29?/9/40	Bf109	Aircraft type: Bf 109 E1; Registration number: 5178?; Unit: Luftflotte 3, ?./J. G. 55	Unknown	Unknown
29?/9/40	Bf109	Aircraft type: Bf 109 E1; Registration number: 6384; Unit: Luftflotte 3, ?./J. G.55	Unknown	Unknown

29?/9/40	Bf109	Aircraft type: Bf 109 E1; Registration number: 2695?; Unit: Luftflotte 3, ?./J. G. 55;pilot rescued	Unknown	Unknown
29?/9/40	Bf109	Aircraft type: Bf 109 E4; Registration number: 1325; Unit: Luftflotte 3, ?./J. G. 55	Unknown	Unknown
29?/9/40	Bf109	Aircraft type: Bf 109 E4; Registration number: 847; Unit: Luftflotte 3, I./J. G. 2?	Unknown	Unknown
29?/9/40	Bf109	Aircraft type: Bf 109 E4; Registration number: 347?4?; Unit: Luftflotte 3, II./J. G. ?	Unknown	Unknown
30/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 4861; Unit: Luftflotte 3, II./J. G. ?	Unknown	Unknown
30/09/1940	Do17	Aircraft type: Do 17 Z3; Registration number: 4227 5K+HR; Unit: Luftflotte 2, 8./K. G. 3	Unknown	Shot down
30/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 4851; Unit: Luftflotte 2, 7./J. G. 27	Unknown	Unknown
30/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 6306; Unit: Luftflotte 2, 4./J. G. 27	Dungenes (= Dungeness?)	Shot down
30/09/1940	Bf109	Aircraft type: Bf 109 E1; Registration number: 1?859; Unit: Luftflotte 2, 6./J. G. 27	Unknown	Unknown
30.?/9/40	Ju88	Aircraft type: Ju 88 A1; Registration number: 3067 4D+BZ; Unit: Luftflotte 2, ?./K. G. 30	Unknown	Unknown
30/09/1940	Bf109	Aircraft type: Bf 109 E4; Registration number: 1190; Unit: Luftflotte 2, II./J. G. 26	Unknown	Unknown

APPENDIX VI: JC & CC NOTES FOR GUIDANCE OF RECOVERY GROUPS

See CD-ROM only.

APPENDIX VII: AIRCRAFT BIOGRAPHIES

Junkers Ju 52

The German equivalent of the C-47 (see below), the Ju 52 tri-motor became the transport 'workhorse' of the Luftwaffe in WWII. Nicknamed 'Tante Ju' or 'Iron Annie' because of its robust construction, the aircraft was produced between 1931 and 1945, initially as a successful airliner and then as a wartime transport and as a stop-gap bomber (Holmes 2005: 91).

As a troop transport it could carry 18 troops or 12 wounded on litters. Some 4845 were built between 1932 and 1944 and post-war construction continued in both France and Spain. So robust was the aircraft that the Swiss airforce did not retire its final aircraft until the 1980s (http://en.wikipedia.org/wiki/Ju_52).

P-38 Lightning

The Lockheed P-38 Lightning was a World War II American heavy fighter aircraft. Developed to a United States Army Air Corps requirement and flown first in January 1939, the P-38 had distinctive twin booms and a single, central nacelle containing the pilot and armament (http://en.wikipedia.org/wiki/P-38). It was the first US fighter to use butt-joined and flush riveted all metal skins and was Lockheed's first venture into the world of high performance military aircraft (Holmes 2005: 185). The P-38F was the first model to see combat.

The aircraft was used in a number of different roles, including dive bombing, level bombing, ground strafing, photo reconnaissance missions, and extensively as a long-range escort fighter when equipped with droppable fuel tanks under its wings. The P-38 was used most extensively and successfully in the Pacific and South-East Asia and China where it was principally a superlative long range fighter bomber (Anderton et al, 1982: 31-35). The P-38 was the only American fighter aircraft in active production throughout the duration of American involvement in the war, from Pearl Harbour to VJ Day. Over 10,000 were eventually built before production ceased in 1949 (TIGHAR 2007: 5).

The appellation 'Lightning' was coined by the RAF when the type was ordered under Lend-Lease in 1940 and was adopted by the Americans the following year (Holmes 2005:185). The model supplied to the RAF was not supercharged and its performance was so disappointing that the order was cancelled. However later variants (including the P-38F and the definitive P-38J) were supercharged and were deployed by the USAAF to the European Theatre in 1942. Subsequently a P-38F had the honour of being the first USAAF to shoot down a Luftwaffe aircraft. The principal role of the aircraft in Europe was that of long range bomber escort. Although the supercharged aircraft was regarded as being reasonably formidable, it was eventually replaced in this role by the legendary P-51 Mustang fighter (http://en.wikipedia.org/wiki/Lockheed_P-38#European_theater).

An estimated 32 complete or partial airframes survive in private collections and museums (http://www.warbirdregistry.org/p38registry). However only one Lightning, a P-38J at the Smithsonian National Air and Space Museum in the USA, survives as an original and unrestored example of the type. None are recorded by Ellis in the UK (Ellis 2006).

Short Sunderland

The iconic Short Sunderland flying boat became the mainstay of RAF Coastal Command during WWII and was a vital weapon in the Battle of the Atlantic. Based on the Short C Class 'Empire' flying boats operated by Imperial Airways in the 1930s, the first prototype was flown in 1937.

At the start of the war the Sunderland Mk I was only available in limited quantities but quickly proved itself an effective anti-surface ship and submarine weapon, as well as being well suited to air-sea rescue. The Sunderland design was improved as a result of war experience and a total of over 450 of the main production model, the Mark III, were built.

During the war the development of aerial depth charges, radar and the Leigh searchlight system made the Sunderland an effective and much feared U-boat hunter, despite a fairly modest range.

The Sunderland was also well defended. It was sturdily built and carried as many as 18 defensive machine guns, earning it the German nickname "Fliegende Stachelsweine" or Flying Porcupine (http://fixedreference.org/en/20040424/wikipedia/Shorts_Sunderland). In 1940 over Norway a single Sunderland was able to beat off an attack by six Ju 88s, shooting one of them down http://fixedreference.org/en/20040424/wikipedia/Shorts_Sunderland).

Although the Sunderland's role was eventually taken over by large land-based maritime patrol aircraft such as the Avro Shackleton, the Sunderland remained in service in its Mark V guise in the Far East until 1959 (Jackson 2003: 217).

It would appear that only two of these aircraft survive in preservation in the UK. Both are Mark Vs (Ellis 2006: 24 & 149).

Ju 88

The Junkers Ju 88 was a World War II Luftwaffe twin-engine, multi-role aircraft. It was one of the most versatile planes of the war.

It proved to be vital to the Luftwaffe throughout the war and served on all fronts. It was used as a bomber, close-support aircraft, nightfighter, torpedo bomber, reconnaissance aircraft, heavy fighter, and even as a giant flying bomb in the Mistel project. It proved adept in the maritime role and, based out of Norway, was used to devastating effect against the Allied convoys bound for Russia.

Flown for the first time in 1936, almost 15,000 Ju 88s were built during World War II (Jackson 2003: 57). Early models deployed during the Battle of Britain suffered very heavy losses but this resulted in a redesign of the aircraft which made the later models less vulnerable and therefore far more effective (http://en.wikipedia.org/wiki/Ju_88).

Around 14 aircraft still exist, although many of these are little more than collections of wreckage recovered from remote crash sites. Several reasonably intact aircraft have been recovered from underwater crash sites in recent years (http://en.wikipedia.org/wiki/Ju_88). Only two complete aircraft are believed to exist, one in the USA and the other at the RAF Museum (Ellis 2006: 149).

Douglas C-47 Dakota

The Douglas C-47 Skytrain is a two engined military transport that was developed from the Douglas DC-3 airliner. Without doubt the transport workhorse of the Allies during WWII, it remained in front line operations for the USAF throughout the 1950s and a few remaining in operation worldwide to this day (http://en.wikipedia.org/wiki/C-47_Skytrain). A total of over 10,000 were built.

More than 1200 C-47s were supplied under Lend-Lease to the RAF where they were known as the Dakota (Jackson 2003: 261).

The aircraft played a vital role in many theatres of the war. Post-war perhaps its most important role was in the Berlin airlift.

Ellis records 17 preserved, instructional or derelict examples of the aircraft in the UK (Ellis 2006).

Consolidated B-24 Liberator

The Consolidated B-24 Liberator was a four engined American heavy bomber, built by Consolidated Aircraft. Whilst perhaps less rugged and harder to fly than the earlier B-17 Flying Fortress (and with a reputation for catching fire), it was a far more modern aircraft and could carry up to 8000 pounds of bombs.

It was produced in greater numbers (over 18,000) than any other American combat aircraft of World War II and still holds the record as the most produced U.S. military aircraft (http://en.wikipedia.org/wiki/B_24_Liberator). It was used by many Allied air forces and every U.S. branch of service during the war, attaining a distinguished war record with its operations in the northern European, Pacific and Mediterranean theatres.

First flown in 1939, it earned the nickname “Flying Boxcar” because of its slab-sided fuselage. The aircraft was sometimes disparaged as "The Flying Coffin" because the only entry and exit from the bomber was in the rear and it was almost impossible for the flightcrew and nose gunner to get from the flight deck to the rear if they were wearing their parachutes (http://en.wikipedia.org/wiki/B_24_Liberator).

In addition to being flown from the UK by the USAAF, it was operated by the RAF as both a bomber and a maritime patrol aircraft. In the latter role the long range variant of the aircraft proved massively significant in the Battle of the Atlantic, enabling the very vulnerable mid-ocean ‘air gap’ to be closed.

Two examples survive in the UK, one at Duxford Aerodrome and the other at the RAF Museum Hendon (Ellis 2006).

APPENDIX VIII: EXISTING RESEARCH AGENDA

The following are the sections of the research agenda for 20th century military sites in the UK in *Modern Military Matters: Studying and managing the twentieth-century defence heritage in Britain: a discussion document* (Schofield et al 2004) identified in that document as being relevant to aircraft crash sites:

A – Improve understanding of the built resource

Objective: to continue to investigate what was built, where and when, and what form the sites took, using appropriate sources (eg documents, field remains, aerial photography).

Much is known of what was built, where, when and why. Indeed this is the area in which most significant progress has been made over the last decade. This knowledge contributes to public awareness and understanding of how the landscape was transformed and fortified; how Britain prepared and was mobilised for war in the period 1914–89. An Atlas of Britain at War would be one result of this research, as would publication of some of this information over the Internet. But some significant gaps in our knowledge do remain.

Specific areas for research:

- **A3 – Cold War** Despite the work undertaken to date (Cocroft 2001; Cocroft and Thomas 2003) gaps remain in our understanding of Cold War material culture. These gaps can be filled in different ways, though some basic principles apply in most cases, such as the value of gathering information from archive and testimonial sources. Communications-related sites, R&D and production sites relating to key programmes of research, civil defence, training , electronic warfare and the role of Information Technology are some key areas where needed. *This objective can be achieved through targeted research, building on official histories, oral testimonial evidence and archives where available, to provide a characterisation and typological framework and indicative site lists.*

B – Improve understanding of surviving resources

Objective: to continue the process of researching and documenting the surviving remains of sites and monuments of this period, whether through aerial, geophysical, remote sensing or field survey (including submerged environments), and at a national, regional or local scale.

While much work has been done, and significant progress made in this area, gaps remain, both geographic and thematic. There is a need to improve our understanding of survival and the reasons for it, in order to provide better public information, to integrate modern military sites more fully within conservation practice in the UK, and to improve our awareness of monument management and risk at a national level.

Specific areas for research:

- **B2 – World War I** With a focus of attention on surviving remains of World War II and the Cold War, World War I has been somewhat neglected in recent assessment programmes (but see Schofield in press and chapters in the various Dobinson reports). Although it does feature as a component in

several thematic studies (eg aviation, Lake 2000) and survey projects (eg Salisbury Plain Training Area, McOmish et al 2001), a synthesis is lacking, using archives to provide context and fieldwork to determine survival and assessment of factories, hospitals, PoW camps, defences, training areas etc. *A synthetic study of World War I on the home front, tapping into various English Heritage and other surveys undertaken to date would be a valuable exercise with a popular book a likely outcome. The objective would be to promote understanding through publication and dissemination, and to give a firm foundation to management decision-making. A separate study of World War I air defence would be a useful addition to current research.*

- ***B3 – Submerged archaeology*** As well as terrestrial remains, much of the material culture of modern warfare survives underwater, off the British coasts or in lakes, rivers and other water bodies, both in the form of shipping (military and civil vessels representing convoys, raiders, minelayers, minesweepers, landing craft, submarines etc), aircraft, tanks, submerged cables and other D-Day artefacts, such as Mulberry harbour remains (see refs in Schofield 2001). The vast majority of these various forms of craft were cut up after each world war, and other than a small number of craft still afloat, the few surviving monuments to the effort, organisation and bravery of some wartime populations are the vessels which sank, and the remains of those who drowned (Oxley 2002). *As an initial step, a study is needed that quantifies and characterises this resource within the wider context of submerged archaeology generally, and assesses its management needs.*

- ***B12 – Cold War*** Despite a survey and assessment of Cold War remains in England (Cocroft 2001; Cocroft and Thomas 2003) some gaps remain where little is known about monument types, surviving examples and their comparative completeness. Research is therefore needed in these areas, involving a combination of documentary research, aerial photographs and field checking.Onesubject includes those structures built to support the civil administration of the country in the event of nuclear attack. Structures in this category include local authority emergency and civil defence headquarters, protected operations centres built by the utilities and private nuclear shelters (see also B10). Detailed typological and locational information is also lacking for towers and masts associated with the government's emergency civil and military microwave communications networks, the NATO-funded systems, national systems, strategic communications, international radio and cable systems to communicate internationally with allies and the Home Office wireless and line radio systems. A fundamental pillar of UK defence policy through most of the Cold War was membership of and contribution to NATO, which included land, sea and air forces, and this whole area – including command and control facilities, air defence systems, logistic installations and training facilities to support British forces assigned to the Central Region of NATO in Germany – requires further assessment. This can be addressed in terms of: infrastructure to support British forces assigned to NATO in the Central Region in Germany (Army 1st British Corps) and RAF Germany; Home Defence military infrastructure; and infrastructure to support world wide operations outside NATO. The material culture of the 'peace movement' also needs to be better understood if the Cold War is to be presented in a balanced and objective way. Some work has already been undertaken on peace camps here and in the USA (See Schofield and Anderton 2000; www.lvrj.com [March 20 edition]), but more focussed research is needed to quantify this resource better, and understand its management needs. *National and local archive research, followed by fieldwork, is needed to identify the full range of structures used for post-war Civil Defence purposes*

and to ensure the due functioning of the utilities along withthe location of private nuclear shelters. Knowledge of the latter topics may be found amongst the members of Subterranea Britannica. (See also B10). Furtherwork, based initially on archive sources and oral-historical evidence, is needed also on communications and the UK's role in NATO. Work on the peace movement should be wide ranging, socially inclusive and innovative, exploring both the material remains and their future management needs. Archive material is of considerable importance for the interpretation and management of sites at which Research and Development and production were undertaken, yet the release of documents to the National Archives will only partly answer questions on many sites. Many of the technical manuals and individual building drawings are regarded as too specialised for the National Archives or may have been destroyed for security reasons. To achieve a better understanding of the range of activities and functionality of key sites, it may be necessary to use oral history programmes to supplement the traditional historical record. The National Trust has, for example, started such a programme at the former Atomic Weapons Research Establishment at Orford Ness, Suffolk, and the British Rocketry Oral History Project forms a core of people pursuing this line of investigation. Some documentation, particularly relating to the United States Air Force, is held in the United States by the Department of the Air Force. However, this material will typically document unit histories, with only incidental references to infrastructure; some remains classified (see D3). *Achieving a better understanding of these R&D and production sites from the Cold War period could be achieved by targeted research, combining analytical field survey with searches for documentary and anecdotal evidence of specific sites or research/ production programmes. Where private firms were used in the production or research programme their own archives may provide valuable source material, while relevant documents are often found on site, even where the site has changed hands. It is likely that this area of research will be best followed through site specific research, rather than as a thematic programme.*

C – Pressures and perceptions

Objective: to determine and assess the various pressures that affect twentieth-century military remains, and changing perceptions of them.

A commonly held view is that public and professional interest in these recent sites is increasing concomitant with the increased pressure on sites for development and reuse. The research potential of these classes of monument – where we can establish (uniquely) precisely what was built and what survives – is also beginning to be realised. Research into these related areas would be of value, identifying future threats and benefits in this modern heritage, and examining its relevance for studying both the modern era, and lessons for understanding the more distant past.

Specific areas for research:

- **C1 – Crash site excavation and loss of records***:* Although this principle may apply more widely, the focus here is crashed military aircraft which are typically subject to uncontrolled excavation and the subsequent loss of records. A Guidance Note, describing best practice, and for circulation to local planning authorities and aviation archaeology groups, has been produced to promote best practice in this area. *Following publication of the Guidance Note, a means to determine its effect and influence will be needed.*

This can include monitoring the quality of licence applications received by the Ministry of Defence, the number of licences granted, and recording the number of excavations notified to NMR and the local SMRs. Future actions will depend in part on how this Guidance Note is received by the aviation archaeology community for sites both on land and at sea. The British Aviation Archaeological Council can advise on this, perhaps two years after publication.

- **C2 – Stability and conservation***:* As interest and awareness of these military sites increases, and more sites are preserved *in situ*, approaches to conservation and stabilisation need to be determined. Guidance Notes issued by the Ministry of Defence and English Heritage, the last specifically for airfield buildings (English Heritage 2003), will be relevant. However, for wider dissemi- nation and to cover the subject matter more generally, a further Guidance Note offering advice on a UK-wide basis may be appropriate, along with the provision of training, as part of building conservation training and appropriate educational courses. Some definitive studies of the stability of, and conservation issues presented by, such structures (including submerged military remains of all material types) will also be essential in determining future conservation strategies. Notable is the requirement to assess the conservation needs of (reinforced) concrete structures, and modern shipwrecks, and the conservation of wall art and outdoor camouflage, both *in situ* and establishing best practice for removal and conservation elsewhere (see section B13). *To meet these needs two research topics are needed: first, a dedicated piece of research (as part of a higher degree in building conservation perhaps) into the stability of concrete structures not built to last, and of the main conservation problems they present. A separate study is needed for wall art, and for shipwrecks. Second, the publication and dissemination of guidance to conservation staff on these related issues, and on the model of that published for Military Aircraft Crash Sites (English Heritage 2002).*

- **C3 – Changing attitudes***:* Attitudes to recent military sites (situated on land and underwater) have changed radically over the last two decades. There is a greater popular interest now in these sites, both as historic places and components of the local scene. Heritage professionals also now regard these sites alongside more conventional monuments and remains, seeing them as opportunities and challenges to be addressed rather than as ugly, unstable and dangerous structures to be removed. Far fewer sites are now being removed without record than was the case a few years ago. In general, county archaeological staff and their equivalents in unitary authorities have a positive and constructive attitude to these remains, but that level of awareness has not yet been fully realised at district level. The subject is also not yet included routinely in undergraduate teaching despite its potential for addressing methodological, theoretical and interpretative goals. It is also not routinely addressed within the National Curriculum, although this too is changing (eg an initiative in Kent to teach teachers how best to use recent military sites, Barnes 2002). Research is needed into the role these twentieth-century military remains perform (why are they important and to whom?), and how they are best incorporated in community archaeology initiatives. *Research is needed into changing attitudes, following popular publications by English Heritage and others (English Heritage 1998; 2000). Have visitor numbers to military heritage attractions increased; and what attitude do local conservation staff take to proposals affecting modern military sites? What is the public perception? Is it generational? This general review of perceptions and approaches could usefully form the subject of a dissertation or thesis by*

a student of heritage management and tourism, building on the results of the MORI poll undertaken within the context of Power of Place *(English Heritage 2000b).*

- **C4 – Social commemoration of warfare** All military sites have the capacity to evoke strong feelings and personal or community responses, and the way they may change over time are themselves important subjects for research. The cultural values attached to sites will inform decisionsmadeabout their future management and presentation. Differing views of significance and the propriety of preservation go to the heart of the debate about what 'heritage' means. Heritage that is closer to us in time may stimulate fiercer passions and add a sharper edge to the issue that actually lies at the heart of conservation: the need to manage our environment so that it enhances the quality of our life while maintaining physical links for future generations to make fresh sense of their own past. *As above, this could usefully form the subject of dissertations or theses by students of heritage management and tourism.*

D – Methodologies

Objective: to explore new approaches to modern military heritage and to ensure its integration with other related agenda, such as sustainability, social inclusion and the related fields of philosophy, sociology, geography and archaeological theory.

What, beyond the simple description of these sites, structures and landscapes, can be gleaned from careful and detailed research, embracing perhaps archaeological survey and excavation, related oral history and archives and using other techniques borrowed from the humanities and social sciences? This theme is about developing the techniques to gain more from the subject and make it as effectively multidisciplinary as the subject matter requires. Many of these ideas are unformed, and will certainly benefit from deeper thought in relation to allied fields. In the spirit of this document they are offered for discussion, however, and for development or not as their merits may require.

Specific areas for research:

- **D1 – The role of excavation and analytical survey** As with all archaeological research, different sites and areas will demand different techniques dependent upon the nature of surviving remains and the questions being asked. But with most areas of archaeological research those decisions are taken within broad parameters determined by experience and know-how. For military archaeology of the recent past the parameters are not yet in place. Although a few excavations and detailed surveys of modern military sites have been completed (some purely to aid presentation) this lack of experience makes it more difficult to set well-thought out and meaningful archaeological conditions and goals for evaluation and fieldwork projects. Work is needed to determine what level of archaeological recording is sufficient or whether other evaluation techniques are appropriate for determining and interpreting what survives. A scoping study of work undertaken to date is needed to determine what was learnt from the various techniques employed on projects completed to date. Following that, and depending on the strength of its outcomes and conclusions, a wide ranging survey may be necessary, involving the excavation and survey of a few extant sites, involving structural recording, survey and excavation strategies, collection of oral accounts and archive accounts (where available) and a critique of the methods applied. This experience can then contribute to

determining the parameters within which future research and evaluation and recording strategies are determined. The activity of excavation or survey as an event may also be used to inspire media and personal interest and (re)create memories about a site's function and meaning; the intimate environment of an excavation could also provide the catalyst for dialogue amongst the groups once separated by the material culture they now join forces to understand. These thoughts are equally relevant for the many wartime and Cold War sites, including peace camps. *Following a scoping study, a survey is needed of the relevance and application of conventional archaeological methods and techniques to modern military sites and structures, perhaps involving well recorded and understood classes such as anti-aircraft sites first instance. The results, if worthwhile, might be published as required. Some experimentation with new techniques and ideas will be a useful next stage, especially for poorly understood sites and sites of discord. The value of cognitive mapping for example is worth exploring, to examine the influence of military sites on the local landscape and its inhabitants.*

- **D3 – Oral history** Personal accounts are useful sources for documenting and interpreting social activities on military sites. But typically these are driven by explicitly social-historical agenda, and often omit asking the types of questions that might aid a fuller interpretation of a site's former use. Questions concerning, for example, use of space and discard patterns. For the Cold War period oral-historical evidence is seen as one of the key methods for advancing understanding. In the interpretation of physical remains technical questions need to be asked relating to on-site maintenance and servicing procedures for various missile systems. Likewise little is known about safeguarding, handling and maintenance procedures surrounding nuclear weapons. Former personnel will be able to reflect on their attitudes to such weapons systems which would be unobtainable from other sources, though service personnel may now be reluctant to speak following recent prosecutions under the Official Secrets Act. The involvement and cooperation of MoDand other government departments may prove helpful in advising on the status of information. Beyond these technical questions, other issues such as daily routines, travel, messing and leisure could be explored. Testimonies may also be used to challenge official histories, which often put a positive gloss on things and impose a logical development process on, for example, weapons procurement programmes, where the reality is often more confused. Detailed information does exist on weapons procurement programmes, but most remains classified. *Where sites exist and former servicemen or occupants can be traced, an archaeologically driven research programme investigating use of space could be considered. One example might be those few PoW camps where former prisoners stayed on and continue to live locally. Again this could form the subject of a research degree, embracing social historical and archaeological objectives. For the Cold War a specific project, with technological and social historical objectives is needed. Many recently redundant USAF airfields have dedicated websites, where veterans post reminiscences about former postings; these are a valuable resource as are warship reunion groups and Regimental historians.*

E – Management principles and frameworks

Objective: to ensure appropriate and effective measures and procedures are in place to preserve andmanagetwentieth-century military resources alongside those of the more distant past.

As a comparatively new addition to the heritage further work is needed to establish modern military remains within the context of conservation practice and philosophy. The main areas where progress is needed are record keeping, adopting a common typology and terminology, and ensuring these sites sit alongside others in management frameworks.

Specific areas for research/progress:

- **E2 – Preservation of archives** Archives relating to modern warfare, and which are significant for archaeological, historical and social historical research, survive in numerous locations, and under various conditions. Some archives held at the National Archives, and those most useful for archaeological research (eg site plans), may be considered by the National Archives to be too specialised, though the resource may be too large for other depositories (eg National Monument Record). Military museums and libraries often have significant holdings. MoD also holds valuable archives (such as the vital Air Ministry Registered Drawings and terrier books), often uncatalogued and held locally, while other sources include the Imperial War Museum, the Royal Air Force Museum at Hendon and local record offices such as that in Winchester which holds an important collection of Royal Navy records relating to shore facilities. Contemporary photographs, many taken unofficially, can provide valuable information on the life of redundant defence facilities. *Meetings should be arranged involving appropriate staff from all organisations which hold historic military archives relating to the function and form of specific military sites, with a view to determining priorities for retention, and agreeing suitable locations. This could be set up initially by theNational Monument Record, with the National Archives, Imperial War Museum and MoD as keypartners. One priority is to catalogue Air Ministry Drawings, vital for archaeological and architectural research on airfields.*
- **E4 – Protection of sites** To ensure the completion of reviews and work programmes that result in appropriate sites having statutory protection, especially in the cases of the more vulnerable and rare monument classes (eg bombing decoys and D-Day sites). There is also a need to ensure that sites continue to be fully recorded on both theNMR and locally held SMRs, meaning that they can be treated as appropriate through the development control process. Records should include both known surviving sites, and those documented in the MPP reports, where some significant buried remains may exist. Finally, it is imperative that measures are put in place to fully record documented aircraft crash sites onSMRsand theNMR, in addition to MoD maintaining their own records. For Anti-invasion defences a catalogue or list of defence landscapes may be appropriate, following the English Heritage defence areas project. *There needs to be incorporation of military sites in Designation Team work programmes, as well as comparable programmes elsewhere. Liaison with NMR staff and with ALGAO should ensure that the need to maintain adequate records is realised. The crash site work also requires continued liaison with MoD, and the idea of producing a list of defence landscapes will require further internal negotiation and discussion including with the DCMS. The Defended Areas project is already underway and the results of this will eventually feed into local planning agenda, and designation programmes.*
- **E5 – Management, presentation and interpretation** Research leading to the publication of best practice guidelines for the management, presentation and interpretation of military heritage sites, on land and underwater, would be useful for curators, conservators and practitioners. With so many of these sites now held and managed by national heritage agencies, local groups and

trusts, and – increasingly – individual owners, such guidance is timely, and would have international appeal. This should be both practical (for example, on earthwork conservation, and determining, for example, that only the guns intended for a site should be presented there) and philosophical (enabling managers to decide whether to present the past as it was or in some diluted form). The Vimy Declaration (currently in draft) on conserving battlefield terrain is a model of what can be achieved in this field (see http://www2.cr.nps.gov/abpp/terraincharter.htm). These guidelines could also usefully address the role contemporary art plays in interpreting military sites. With the experience of managing sites like Dover Castle and Fort George, this best practice guidance is something the national heritage agencies should consider commissioning. Further 'best practice' guidelines in managing specific classes of monument (marine, wall art, airfields, for example) should be produced as needs arise. *Initially discussions should be held to address the market for such guidelines, their content and scope, potential authors, and funding streams.*

F – Articulation, co-ordination and publication

Objective: to co-ordinate the objectives and aspirations of the many groups, individuals and specialised archaeological organisations and agencies who seekto develop an understanding of the scale and logic of militarisation in Britain throughout the twentieth century, for the purposes of better working practices, and improved understanding and awareness. This should be achieved through cooperation and networking, the university sector and voluntary and local organisations being key players.

Specific areas for research:

- **F1 – Local level** Opportunities should be sought for local studies within the terms of this discussion document and the national programmes of research undertaken to date. Defence heritage, perhaps more than any other subject, lends itself to this approach given the need to tap oral-historical evidence, local archives and records, past news coverage, and field remains. Here is the opportunity for community archaeology, for engaging parish councils, local history groups and schools in a wide field of study that has national significance and relevance. As an example, anti-invasion defences inparticular provide an opportunity to examine the close relationships that existed in the minds of military planners between defence and militarisation and the natural and built environment. Defended areas, where these survive now much as they were in 1940, provide opportunities to study this relationship in terms of military tactics and strategies of defence and counter-attack; also in terms of the impact the military presence had on the local community. This consideration of defended areas or military landscapes has potential for public education and enjoyment, as well as having a role within the national curriculum. *By promoting this subject through publications, talks etc, and through teacher training days – of the type organised by English Heritage SE Region – local studies will emerge. Professional archaeologists and curators should encourage such initiatives and guide them in terms of advice, provision of records and quality control input.*

APPENDIX IX: LIST OF MILITARY AIRCRAFT FLOWN OVER THE UK 1912-1945

The following tables have been included by kind permission of the compiler Dr Vince Holyoak of EH (© Vince Holyoak):

Table 1.1: Aircraft utilised by the RFC, RNAS, RAF and US Navy within the UK 1912-18

Manufacturer/ Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
AD Flying Boat	1917-	MR	Hispano-Suiza	1,512	Wooden hull and frame, linen covering	29	0 (0)	Two-seat patrol flying boat in RNAS service from 1917.
Airco DH 1	1915-17	F	Renault	729	Wooden frame, linen covering	173	0 (0)	Escort and patrol fighter, single-seat pusher type. Used in UK in Home Defence role until superseded in 1917.
Airco DH 2	1915-17	F	Gnome	428	Wooden frame, linen covering	400	1 (1)	Pusher type which equipped RFC's first single-seat fighter squadron in 1916. Short term success in dealing with new Fokkers but was withdrawn from service in mid-1917.
Airco DH 4	1917-19	B, Recon	RR Eagle or RAF 3a	913	Wooden frame, linen covering	1,449	0 (0)	Two-seat tractor biplane. The DH 4 was the first aircraft designed specifically for day bombing, and considered to be best single-engine day bomber of WWI. Served with both the RFC and the RNAS, in the case of the latter from Redcar and Yarmouth in the anti-Zeppelin role.
Airco DH 5	1917-18	F	Le Rhone	454	Wooden frame, linen covering	550	0 (0)	Attempt to give a tractor type fighter a good forward view. Unpleasant flying characteristics and short service career.
Airco DH 6	1916-19	T, MR	RAF 1a, Renault or Curtis OX-5	663	Wooden frame, linen covering	2,282	0 (0)	Designed as a trainer. From 1918 the Avro 504 became the standard training aircraft and the DH 6 was used to equip 34 RNAS flights around the UK's coast in the MR and anti-submarine role, although with little success.
Airco DH 9	1918-19	B	BHP or AS Puma	996	Wooden frame, linen covering	3,204	1 (1)	Development of the DH4 which suffered engine reliability problems, with consequent heavy losses. Utilised in the UK by the RNAS and RAF for coastal patrols in the anti-submarine and anti-zeppelin roles.

Manufacturer/ Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Armstrong Whitworth FK 10	1916-1918	F, B	Le Rhone, Clerget	559	Wooden frame, linen covering	8	0 (0)	Two-seat quadruplane built for the RNAS, most of which had been scrapped by the end of the war.
Avro 500	1913-15	T	Gnome	420	Wooden frame, linen covering	?	0 (0)	Two-seat tractor biplane produced in small numbers and used by RFC and RNAS as a trainer.
Avro 503	1913-14	T	Gnome	420	Wooden frame, linen covering	?	0 (0)	Two-seat training seaplane, a few of which delivered to RNAS before the war.
Avro 504	1914-33	F,T	Le Rhone, Clerget or Gnome	420	Wooden frame, linen covering	7,948	8 (5)	Important two-seat tractor biplane initially used by RFC for reconnaissance and by the RNAS as a bomber. First aircraft shot down by the Germans. Hurriedly converted to single-seat Home Defence fighter to counter Zeppelin raids. Later relegated to training.
Beardmore WB III	1918-19	F	Le Rhone or Clerget	404	Wooden frame, linen covering	100	0 (0)	Single-seat carrier-based scout, a derivative of the Sopwith Pup. An early attempt to build an aircraft exclusively for carrier-borne operations. Had folding wings and retractable undercarriage for easier storage. By October 1918 55 were in service.
Blackburn Kangaroo	1918-19	B	2 x RR Falcon	2,401	Wooden frame, linen covering	16	0 (0)	Land-based biplane anti-submarine bomber with crew of four. Used with some success from August 1918 by 246 Sq RAF flying from Seaton Carew who destroyed one U-Boat and damaged four others.
Bleriot XI/Parasol	1911-15	F	Gnome	348	Wooden frame, linen covering	?	0 (0)	The Type XI and a developed version known as the Bleriot Parasol, used in limited numbers by the RFC and by the RNAS.

Manufacturer/ Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Bristol F2 Fighter	1917-32	FB	RR Falcon	877	Wooden frame, linen covering	4,470	5 (5)	Highly successful two-seat biplane fighter and reconnaissance aircraft, with both forward and rearward firing machine guns. Designed as a replacement for the BE 2, it entered front line service with the RFC in mid 1917 and remained with the RAF until 1932.
Bristol Scout	1914-16	F	Le Rhone, Clerget or Gnome	340	Wooden frame, linen covering	371	2 (2)	Single-seat biplane fighter, in 1916 the Scout was the first British aircraft to be fitted with a synchronised forward firing machine gun to see action. However, it was already outclassed in terms of performance and reverted to experimental use. Utilised by both the RFC and the RNAS. Also the first aircraft with a wheeled undercarriage to take off from a carrier.
Bristol TB 8	1914-16	F	Le Rhone or Gnome	699	Wooden frame, linen covering	51	0 (0)	Two-seat tractor biplane initially intended for the RFC but rejected by them and utilised instead by the RNAS for Home Defence duties during the early part of the war.
Caudron GIII	1913-16	T	Le Rhone, Gnome or Anzani	850	Wooden frame, linen covering	?	0 (0)	Key French designed and manufactured two-seat sesquiplane which, together with subsequent developments, equipped 40 French units but which was used in the UK as a trainer by the RNAS (124 delivered), the RFC and the US Army Air Service (192 delivered).
Caudron GIV	1916-17	B	2 x Le Rhone or Anzani	850	Wooden frame, linen covering	?	0 (0)	Twin-engine, two-seat long range bomber, 55 of which were delivered to the RNAS for long range bombing duties, operating with 4 and 5 Wings at Petit Synthe. Replaced by the Handley Page 0/100.
Curtiss H4	1914-18	MR	2 X CURTISS OX-5, ANZANI OR CLERGET	1,360	Wooden hull and frame, linen covering	?	0 (0)	Twin-engine four-seat biplane flying boat, built under licence in the UK. Known as the `Small America' to distinguish it from the larger H12 later taken into service, 64 of this type were operated by the RNAS from Felixstowe and Killingholme. Suffered many problems, but made important contribution to flying boat development.

Manufacturer/ Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Curtiss H16	1918-19	MR	2 x RR Eagle	3,346	Wooden hull and frame, linen covering	?	0 (0)	Twin-engine four-seat biplane flying boat, larger developed version of the H12. Approximately 75 were ordered for the RAF, operating from Killingholme and Yarmouth in the anti-submarine role. A further 50 aircraft were flown in the UK by the US Navy, again operating from Killingholme.
Curtiss R2/R4	1915-18	T	Curtiss XV	?	Wooden frame, linen covering	?	0 (0)	Intended for use in the reconnaissance role, 100 were ordered for RNAS service in 1915. The aircraft proved to be under powered and was relegated to armament training.
Curtiss JN3	1915-18	T	Curtiss OX5	?	Wooden frame, linen covering	?	0 (0)	A total of 97 of this US aircraft were delivered to the RNAS for use in the training role.
Curtiss JN4	1917-18	T	Curtiss OX5	800	Wooden frame, linen covering	?	0 (?30)	The most famous US training aircraft of the war and inter-wars period, some 80 `Jennys' were delivered to the RNAS for training duties and 100 served with the RFC.
Fairey III	1918-35	F	Maori II or RR Eagle	1,476	Wooden frame, linen covering	486	1 (1)	Two-seat biplane reconnaissance aircraft (RAF IIIA land plane) and bomber (RNAS IIIB seaplane). Saw limited service before the end of WWI. Post war IIID had either wheels or floats and served with both the RAF and FAA, carrying out long endurance flights.
Fairey Campania	1918-19	MR	RR I, IV or Maori	1,693	Wooden frame, linen covering	40	0 (0)	Two-seat coastal patrol or carrier-borne reconnaissance seaplane. First aeroplane designed for use on board a carrier. Operated from seaplane stations at Calshot, Dundee and Portland.
Fairey Hamble Baby	1917-18	MR	Clerget	630	Wooden frame, linen covering	180	0 (0)	Single-seat anti-submarine patrol seaplane. Derivative of the Sopwith Baby, reworked by Fairey who introduced for the first time trailing edge flaps to increase wing lift. Used by RNAS during 1917-18 operating from coastal stations in the UK and abroad.
FBA Flying Boat	1914-18	T	?	?	Wooden hull and frame, linen covering	?	0 (0)	Small two-seat flying boat, 116 of which were delivered to the RNAS for training duties.

Manufacturer/ Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Farman MF7 and MF11	1913-16	Recon , B, T	Renault or Lorraine	652	Wooden frame, linen covering	?	0 (0)	Introduced to RFC and RNAS service in 1913, the MF7 was known as the `Longhorn' because of its landing skids and the MF11 (Type 1914) as the `Shorthorn'. Used initially in the reconnaissance role, both were rapidly relegated to training.
Farman MF20	1914-1916	Recon , B, T	Gnome	372	Wooden frame, linen covering	?	0 (0)	A two-seat land or sea plane which equipped the RNAS in small numbers, flying from Eastchurch initially and then from Belgium and in the Dardanelles.
Farman F40	1915-16	F	Renault	?	Wooden frame, linen covering	?	0 (0)	A single-seat pusher, 50 of this type were delivered for RNAS service, some operating from coastal air stations in the UK.
Grahame-White XV	1914-16	T	Le Rhone or Gnome	?	Wooden frame, linen covering	80	0 (0)	Two-seat pusher biplane, 80 of which were used by the RNAS as a trainer during early part of war, mostly flying from Chingford.
Handley Page 0/100	1916-18	B	2 x RR Eagle	3,772	Wooden frame, linen covering	46	0 (0)	First successful night heavy bomber, having suffered initial heavy losses in daylight role. Three seat biplane with folding wings to enable it to fit into front line hangars. Served with the RNAS and later the RAF.
Handley Page 0/400	1918-21	B	2 x RR Eagle	3,864	Wooden frame, linen covering	554	0 (0)	Development of 0/100, became standard equipment with the Independent Force, the strategic bombing arm of the newly-formed RAF.
Handley Page V/1500	1918-20	B	4 x RR Eagle	7, 368	Wooden frame, linen covering	90	0 (0)	Largest RAF night bomber of WWI, with a crew of up to 7. Aircraft of 166 Sq Bircham Newton were waiting to take off to bomb Berlin when the Armistice was signed.
Martinsyde G.100 / G.102 Elephant	1916-18	F, B	Beardmore	815	Wooden frame, linen covering	271	0 (0)	Initially conceived as long range single-seat biplane fighter. Weight and poor manoeuvrability saw the G.100 (of which 100 were built) relegated to use as light bomber and ground attack aircraft. Subsequent development, the G.102 `Elephant' (of which 171 built) used in similar role, and as long range escort.

Manufacturer/ Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Martinsyde F3	1918	F	Hispano-Suiza	?	Wooden frame, linen covering	6	0 (0)	Single-seat biplane fighter, 4 of 6 produced serving in Home Defence role in 1918. Rapidly developed into the F4 Buzzard.
Martinsyde F4 Buzzard	1918-19	F, Comms	Hispano-Suiza	?	Wooden frame, linen covering	65	0 (0)	Single-seat biplane, fastest Allied fighter of WWI, although reached squadrons too late to see active service. Used as high speed communications aircraft, the Sopwith Snipe becoming instead the standard post-war fighter.
Martinsyde S1 Scout	1915-16	F	Gnome	?	Wooden frame, linen covering	60	0 (0)	Single-seat tractor type biplane, saw approximately 6 months service on Western Front with RFC before being relegated to training duties. Initially intended for use in Home Defence role, it was also found inadequate for these duties.
Morane Saulnier N	1914-15	F	Le Rhone	444	Wooden frame, linen covering	49	0 (0)	Single-seat monoplane fighter which equipped four squadrons of the RFC.
Nieuport 12 Two-seat	1915-16	F, Recon, B	Clerget or Beardmore	550	Wooden frame, linen covering	?	0 (0)	Two-seat biplane, initially purchased from the French but then subsequently manufactured under licence in the UK. Equipped both the RNAS and the RFC.
Nieuport 11/17/24 Scouts	1915-17	F	Le Rhone	375	Wooden frame, linen covering	?	3 (1)	French-built Single-seat fighting scouts, successive types of which equipped the RNAS, mostly operating on the Western Front, but also in small numbers from Eastchurch.
Norman Thompson NT 2B	1917-19	T	Hispano-Suiza, Beardmore or Sunbeam Arab	1,200	Wooden frame and hull, linen covering	79+	0 (0)	Two-seat flying boat trainer which operated with the RNAS from Calshot, Lee-on-Solent and Felixstowe. Still in service at the end of the war.
Norman Thompson NT 4	1916-18	MR	2 x Hispano-Suiza	2,078	Wooden frame and hull, linen covering	50	0 (0)	Four-seat anti-submarine flying boat used by the RNAS, operating from Calshot, Cattewater, Dundee, Felixstowe, Invergordon, Killingholme and Scapa Flow.

Manufacturer/ Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Royal Aircraft Factory BE2	1914-19	Recon	Renault or RAF Ia	579	Wooden frame, linen covering	3,241	1 (1)	Mainstay RFC two-seat tractor type, the first to see mass production. Used from outbreak of WWI. Used as night fighters by RFC Home Defence units against the Zeppelin.
Royal Aircraft Factory BE8	1913-16	B, Recon	Gnome	?	Wooden frame, linen covering	55	0 (0)	Two-seat tractor type, initially used as a scout and subsequently as a trainer, and in the Spring of 1915 as a light bomber. Known as `The Bloater'.
Royal Aircraft Factory BE 12	1916-18	FB	RAF 4a	740	Wooden frame, linen covering	468	0 (0)	Adaptation of BE2, single-seat fighter which saw limited service in 1916 before being relegated to the role of light bomber.
Royal Aircraft Factory FE 2	1914-18	FB	Beardmore or RR Eagle	936	Wooden frame, linen covering	2,190	1 (1)	Highly successful two-seat pusher type which saw front line service in France between 1915-18, first as a fighter and later in the night bomber and ground attack role.
Royal Aircraft Factory FE 8	1915-17	F	Gnome	405	Wooden frame, linen covering	182	0 (0)	Single-seat pusher type, outdated on entry to front line service and soon relegated.
RE 5	1914-15	B, Recon	Austro-Daimler or Beardmore	?	Wooden frame, linen covering	24	0 (0)	Two-seat tractor type, first of the RE (Reconnaissance Experimental) types to reach full production. Served almost exclusively with the RFC.
RE 7	1915-16	B, Recon	Beardmore	1,038	Wooden frame, linen covering	250	0 (0)	Two-seat tractor type, conceived as day bomber. Served with the RFC, although weak defensive armament saw it quickly superseded.
RE 8	1916-20	B, Recon	RAF 4a	819	Wooden frame, linen covering	4,077	1 (1)	Mainstay two-seat tractor type of the second half of WWI, equipping 19 Squadrons in France.

Manufacturer/ Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Short Bomber	1915-17	B	RR Eagle or Sunbeam	2,272	Wooden frame, linen covering	83	0 (0)	Two-seat tractor type biplane. Development of Short 184 seaplane, delivered to 3 Wing RNAS spring 1916 and also to 7 Sq RNAS late in the year. Took part in `strategic' operations as night bomber with 3 Wing from late 1916 but withdrawn from service April 1917.
Short 74	1914-15	MR	Gnome	954	Wooden frame, linen covering	18	0 (0)	Two-seat ship-borne float plane used by RNAS. Chiefly known for Cuxhaven raid.
Short 184 / 320	1915-21	TB, Recon , B	Sunbeam, Renault or RR Eagle	1,683	Wooden frame, linen covering	300	1 (1)	Highly successful RNAS two-seat biplane seaplane which became the first aircraft to sink a ship with a torpedo and was stationed at coastal bases around the UK. Later converted as a night bomber. Improved 320 variant (1918-19) used for anti-submarine and reconnaissance. Other sources suggest as many as 900 were built.
Short 827 / 830	1914-18	B, Recon	Sunbeam or Salmson	1,545	Wooden frame, linen covering	120	0 (0)	Two-seat reconnaissance/bomber seaplane, operated with RNAS from coastal air stations, seaplane carriers and armed merchantmen.
Sopwith Baby	1914-18	B and Recon	Gnome or Clerget	557	Wooden frame, linen covering	456	0 (0)	Single-seat twin-float seaplane development of the pre-war Schneider Trophy winning aircraft. Employed with little success by RNAS in anti-Zeppelin role over North Sea.
Sopwith Camel	1917-19	F	Clerget	422	Wooden frame, linen covering	5,490	2 (2)	Most successful British fighter of WWI in terms of combat kills, used by both RFC and RNAS. Also used in ground attack role. 2F1 variant developed for ship-board use.
Sopwith T1 Cuckoo	1918-23	TB	Wolseley Viper or Sunbeam Arab	999	Wooden frame, linen covering	150	0 (0)	Developed from 1916, RNAS land plane which could carry a single torpedo. Entered service too late to see action in WWI.

Manufacturer/ Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Sopwith Pup	1916-18	F	Le Rhone	357	Wooden frame, linen covering	1,770	2 (2)	Single-seat tractor, entered service with RFC in mid 1916. 290 served with RNAS and type carried out first deck landing on a moving ship. Also used in Home Defence role.
Sopwith Salamander	1918-19	FB	Bentley BR 2	1,139	Wooden frame, linen covering	882	0 (0)	Ground attack aircraft which entered service right at the end of WWI.
Sopwith Sneider	1915-18	F	Gnome	?	Wooden frame, linen covering	160	0 (0)	Seaplane version of the Tabloid which operated from RNAS coastal stations around the UK.
Sopwith Snipe	1918-26	F	Bentley BR 2	916	Wooden frame, linen covering	1,100	0 (0)	Development of the Camel, entered service right at the end of WWI and became the first mainstay fighter of the peacetime RAF.
Sopwith 1½ Strutter	1916-18	FB, Recon	Clerget	572	Wooden frame, linen covering	1,315	0 (0)	Used by both RFC and RNAS, a single or two-seat tractor type. Outclassed as a fighter by late 1916 and relegated to the bombing role. From early 1918 served as a trainer.
Sopwith Tabloid	1914-16	FB	Gnome	303	Wooden frame, linen covering	39	0 (0)	Single-seat Scout and light bomber, development of pre-war racer. Served with RFC and RNAS and carried out first raid on Germany
Sopwith Triplane	1917	F	Clerget	500	Wooden frame, linen covering	140	1 (1)	A single-seat triplane used exclusively by RNAS, highly manoeuvrable and with a good rate of climb but soon outclassed and replaced by the Camel.
Spad Scout (VII)	1916-18	F	Hispano Suiza	500	Wooden frame, linen covering	?	0 (0)	A highly successful French designed single-seat tractor biplane, built in limited numbers under licence in the UK for the RNAS and subsequently used on the Western Front by the RFC.

Manufacturer/ Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Vickers FB 19	1916-17	F	Clerget or Le Rhone	407	Wooden frame, linen covering	36	0 (0)	Used primarily in UK in the Home Defence and training role.
White and Thompson No.3	1915-16	MR	Beardmore	c.1,000	Wooden hull and frame.	8	0 (0)	Two-seat anti-submarine biplane flying boat used in extremely limited fashion by the RNAS.
White and Thompson `Bognor Bloater'	1915-16	MR	Renault	?	Wooden monocoque fuselage.	10	0 (0)	Two-seat coastal patrol biplane used in extremely limited fashion by the RNAS, operating from the coastal air stations at Eastbourne, Great Yarmouth and Killingholme.
Wight 840	1915-17	TB	Sunbeam	c.2,000	Wooden frame, linen covering	70	0 (0)	Two-seat torpedo seaplane used by the RNAS. Operated from Felixstowe in the anti-submarine role.
Wight Pusher	1914-16	Recon	Salmson	c.1,500	Wooden frame, linen covering	11	0 (0)	Two/three-seat reconnaissance seaplane with folding five-bay wings. Two on board Ark Royal in the Dardanelles, remainder at coastal stations.
Wight `converted' Seaplane	1917-?	MR	RR Eagle or Sunbeam Maori	1,708	Wooden frame, linen covering	37	0 (0)	Two-seat biplane used by the RNAS in the anti-submarine role from early 1917, flying from Calshot, Dover and Portland.

Table 1.2: Aircraft utilised by the Imperial German Military Air Service and the Imperial Navy Service within the UK 1914-1918

Manufacturer / Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe Construction	Total Produced	Survivors: Global (UK)	Notes
Friedrichshafen FF 29	1914-15	B	Mercedes D II	?	?	?	0 (0)	Single engine biplane Float-plane with a crew of two which was utilised by the German navy in small-scale nuisance raids against UK shipping and coastal targets.
Gotha G.IV and V	1916-18	B	2 x Mercedes D IVa	2,391	Plywood frame with canvas covering	232	0 (0)	Long range bomber with crew of three. By late 1916 the effectiveness of Zeppelins had been neutralised by incendiary bullets and improved defences, so a special unit (Kampgeschwader 3) equipped with GIVs was established in order to bomb London, which it did from 1917 onwards.
Zeppelin (Staaken) R. VI	1917-18	B	4 x Maybach or Mercedes D IVa	11,462	?	18	0 (0)	Heavy bomber with crew of seven and endurance of between seven and eight hours. Known as the `Giant', it took part in raids on France and the UK from 1917 onwards.

Table 1.3: Aircraft utilised by the RAF and Fleet Air Arm within the UK 1919-1936

Manufacturer/Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Armstrong Whitworth Atlas	1927-35	AC, Comms, T	AS Jaguar IVc	1,159	Tubular metal frame, linen covering	446	0 (0)	Two-seat general purpose biplane, the first to be specifically designed for Army co operation work, it became operational in late 1927, remaining in service for six years, finally as a communications aircraft and advanced trainer.
Armstrong Whitworth Siskin	1924-32	F	AS Jaguar	828	Tubular metal frame, linen covering	534	0 (0)	Important early inter-war period RAF single-seat day fighter which was highly successful and exported.
Avro Aldershot	1924-25	B	RR Condor III	?	Wooden frame, linen covering	15	0 (0)	A heavy, day, long range bomber with crew of 5. Equipped only 99 Sq RAF.
Avro Anson	1936-68	MR,T	2x AS Cheetah	2,440	Tubular steel with spruce and plywood covering and Bakelite plywood wings	11,000	30 (16)	Introduced as GR aircraft, later adopted as principal trainer. Only one wartime military version (Mk I) survives. First RAF aircraft with retractable undercarriage.
Avro Bison	1922-29	Recon, MR	Napier Lion	1,892	Wooden frame, linen covering	63	0 (0)	A biplane reconnaissance aircraft with a crew of 3 to 4 which equipped 3 and 22 Sq RAF before passing to FAA, who operated it with 4 UK based flights. Produced in two main variants and superseded by the Fairey IIIF in 1929.
Avro Tutor/Prefect	1935-39	T	AS Lynx	?	Tubular metal frame, linen covering	795	3 (1)	Two-seat trainer chosen to replace the Avro 504, 380 of which were in RAF service, many coming on to the civilian market at the end of their careers. Also used extensively abroad.
Blackburn Baffin	1934-36	TB	Bristol Pegasus	1,900	Composite wood and metal frame, linen covering	77	0 (0)	Two-seat carrier borne torpedo bomber. Succeeded the Ripon as the FAA's principal strike aircraft. Served with three FAA squadrons, 62 of the production run were actually converted Ripons.

Manufacturer/Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Blackburn Dart	1922-33	TB	Napier Lion	1,746	Composite wood and metal frame, linen covering	70	0 (0)	Single-seat carrier torpedo bomber which equipped three UK based flights of the FAA. Made the first night landing upon a carrier and a twin float seaplane version also equipped four RAF Reserve Training Schools.
Blackburn 14/24 Iris	1930-32	MR	3 x RR Condor	?	Wooden hull and frame and linen covering.	8	0 (0)	Large reconnaissance seaplane, five versions of which were built and which carried out many long distance flights.
Blackburn 20/32 Perth	1934	MR	3 x RR Buzzard	?	Metal hull and frame, linen airframe covering	4	0 (0)	Triple engine flying boat which saw limited service.
Blackburn Ripon	1929-34	TB, MR	Napier Lion XIA	1,934	Composite wood and metal frame, linen covering or all metal	92	0 (0)	Two-seat carrier-borne torpedo bomber biplane which superseded the Dart in FAA service. Could also be converted for use in the long range reconnaissance role.
Blackburn Shark	1935-38	TB	AS Tiger VI	1,969	Metal structure, with Alclad monocoque fuselage and fabric covered wings	200	0 (0)	Two or three-seat biplane torpedo bomber which served with three FAA squadrons before being relegated to the training role from Lee on Solent.
Boulton Paul Overstrand	1935-38	B	2 x Bristol Pegasus	3,607	Tubular metal frame, linen covering	24	0 (0)	Uprated version of the Sidestrand, became the first RAF aircraft to mount a power operated turret, entering service with 101 Sq in early 1935.
Boulton Paul Sidestrand	1929	B	2 x Bristol Jupiter VIII	2,731	Tubular metal frame, linen covering	18	0 (0)	Large twin engine high performance biplane replacement for the DH 10 daylight medium bomber. Carried crew of 3-5 and equipped 101 Sq RAF at Bircham Newton.
Bristol Bulldog	1929-37	F	Bristol Jupiter	951	Tubular metal frame, linen covering	500	1 (1)	Single-seat biplane fighter, one of the last open cockpit types to see widespread service with the RAF, equipping 10 Squadrons and at one point equipping 70% of the home defence fighter force.

Manufacturer/Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Fairey Fawn	1924-29	B, AC	Lion II	?	Wooden frame, linen covering	48	0 (0)	Two-seat biplane designed to replace the DH 9 in the day bomber, reconnaissance and Army co operation role.
Fairey Flycatcher	1923-34	F	AS Jaguar III or IV or Bristol Mercury II	923	Wooden wings with linen covering, composite wood and metal fuselage, metal and fabric covered	195	0 (0)	The only British fighter in FAA service between 1924 and 1932 and both highly successful and highly significant. Land based and carrier borne variants.
Fairey Fox	1926-31	B	Curtis D12	?	Wooden frame, linen covering	35	0 (0)	Technically innovative replacement for the Fawn day bomber which included water cooled engine, metal propellor, retractable radiator and high efficiency wing aerofoils. Later models (the Mk II) was all metal in construction.
Fairey Gordon / Seal	1931-34	B, Recon	AS Panther IIA	1,590	Tubular metal frame, linen covering	270	0 (0)	A two-seat daylight bomber and reconnaissance aircraft designed to replace the Fairey III, with which it shared many design similarities. Used predominantly by the RAF but also by the FAA who renamed their variant the Seal.
Fairey Hendon	1936-39	B	2 x RR Kestrel	5,805	Tubular steel and light alloy frame, linen covering	14	0 (0)	Highly innovative in design: first RAF cantilever monoplane heavy bomber. Carried crew of 5 and equipped 38 Sq RAF. Plans to produce a further 60 aircraft were dropped in favour of other newer designs.
Fairey Seafox	1937-40	MR	Napier Rapier	1,729	All metal with monocoque fuselage and fabric covered wings	64	0 (0)	Two-seat reconnaissance biplane and spotter seaplane used by the FAA. Equipped a number of cruisers and catapult flights on the outbreak of WWII, and took part in the successful action against the Graf Spee.

Manufacturer/Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Gloster Gauntlet	1934-40	F	Bristol Mercury	1,257	Tubular metal frame, linen covering	228	0 (0)	Single-seat biplane fighter, already largely obsolete by its introduction to service. Last open cockpit fighter in RAF service, which equipped 15 squadrons.
Gloster Grebe	1923-29	F	Bristol Jupiter IV	779	Wooden frame, linen covering	129	0 (0)	Successful single-seat day fighter which served with 6 RAF squadrons before being replaced by the Siskin.
Handley Page Heyford	1930-39	B	2 x RR Kestrel or Tiger	4,181	Tubular metal frame, linen covering	254	0 (0)	Four seat biplane heavy night bomber, the last biplane heavy bomber to enter RAF service, equipping 99 Sq from July 1933.
Handley Page Hinaidi	1929-35	B	Jupiter, AS Jaguar, RR Buzzard or RR Kestrel	1,386	Wooden frame, linen covering	52	0 (0)	Four seat biplane heavy night bomber. Developed version of the Hyderabad which could carry an extra 350 Ib in bombs, equipping 99 Sq RAF from late 1929.
Handley Page Hyderabad	1925-34	B	2 x Lion	4,050	Wooden frame, linen covering	45	0 (0)	Twin engine heavy night bomber which saw service with 4 UK based squadrons, starting with 99 Sq at Bircham Newton. The RAF's last all wooden bomber.
Hawker Audax	1932-41	AC, T	RR Kestrel	?	Tubular metal frame, canvas and metal covering.	650	1 (1)	Two-seat biplane close support and reconnaissance aircraft for Army co operation work. Replaced the AW Atlas and eventually became a trainer, in which role it served until 1941.
Hawker Demon	1931-39	F	RR Kestrel	?	Tubular metal frame, canvas and metal covering.	234	1 (1)	Two-seat biplane fighter, adaptation of the Hart bomber with uprated performance and armament. A later variant had a hydraulically operated turret installed in the rear cockpit.

Manufacturer/Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Hawker Hardy	1935-43	B, GR, Tug	RR Kestrel	1,452	Tubular metal frame, canvas and metal covering.	47	0 (0)	Two-seat biplane light bomber which competed in terms of performance with contemporary fighters. It entered service with 3 overseas squadrons in 1935 but was quickly relegated to home service with the Auxiliary Air Force and then became a tug.
Hawker Hart / Osprey	1930-43	B, MR, Tug	RR Kestrel	1,150	Tubular steel frame, canvas and metal covering.	969	2 (2)	Two-seat biplane light bomber which entered RAF service in 1930 and eventually equipped seven UK-based squadrons as the Hart. Fitted with folding wings and flotation gear and renamed the Osprey, it also equipped FAA from 1932 onwards.
Hawker Hind	1935-40	B	RR Kestrel	1,477	Tubular metal frame, canvas and metal covering.	692	2 (2)	Two-seat biplane day bomber replacement for the Hawker Hart, with which it shared many design characteristics.
Hawker Horsley	1926-35	B, TB	RR Condor or AS Leopard	2,163	Mk I all wooden, Mk II composites, Mk III all metal.	38	0 (0)	Single engine biplane day bomber with crew of 2, later developed as a land plane torpedo bomber (Mk III). The Mk I was the last all wooden aircraft to be constructed by Hawkers.
Hawker Woodcock	1925-28	F	AS Jaguar II or Bristol Jupiter IV	638 (Mk I) 943 (Mk II)	Wooden frame, linen covering	63	0 (0)	The first fighter aircraft built in Britain following the end of WWI. Single-seat which followed conventional lines and was superseded by the Gamecock.
Miles Nighthawk	1937-38	T	DH Gipsy Six	?	?	?	0 (0)	Trainer.
Nieuport Nighthawk	1919-23	F	AS Jaguar or Bristol Jupiter	?	Wooden frame, linen covering	70	0 (0)	French designed fighter manufactured under licence in the UK for use as RAF fighter in the immediate inter-war period.
Nieuport Nightjar	1922-23	F	Bentley BR 2	984	Wooden frame, linen covering	18	0 (0)	Single-seat carrier-borne fighter, a conversion of surplus Night Hawks, which saw use with the FAA.

Manufacturer/Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Saro Cloud	1933-36	T	2 x AS Serval	?	All metal	17	0 (0)	Amphibious flying boat trainer which saw limited service with 48 Sq RAF at Manston and the Seaplane Training Squadron at Calshot.
Saro London	1934-44	MR	2 x Bristol Pegasus	?	All metal	33	0 (0)	Flying boat.
Short Rangoon	1931-36	MR	3 x Bristol Jupiter	?	Alloy hull and frame, linen covering	6	0 (0)	Triple engine biplane amphibious flying boat used in limited fashion in UK by 210 Sq at Pembroke Dock before being sold to Imperial Airways.
Supermarine Southampton	1925-36	MR	2 x Napier Lion V	?	Alloy hull , wooden frame, linen covering	66	1 (1)	Twin engine biplane flying boat which served both in the UK and Far East, achieving fame for long distance flight.
Vickers Vildebeest	1933-40	TB	Bristol Perseus or Pegasus	2,147	Tubular steel frame with fabric covering and metal panels.	152	0 (0)	Two (later three) seater biplane torpedo bomber, one of the most prominent utilised by the RAF between the wars but which was eventually replaced in UK service by the Beaufort..
Vickers Vimy	1919-28	B	2 x RR Eagle or Hispano Suiza	2,463	Wooden frame, linen covering	221	1 (1)	Twin engine, biplane heavy bomber with crew of three. Entered service immediately after WWI. Converted civilian example was the first aircraft to fly the Atlantic non-stop.
Vickers Virginia	1924-38	B	2 x Napier Lion V	4,386	Wooden frame, linen covering	260	0 (0)	Twin engine biplane bomber with crew of four which equipped several RAF Squadrons.
Westland Wallace	1933-36	B	Bristol Pegasus	1,490	Tubular steel frame with fabric covering and metal panels	174	1 (1)	Development of the Wapiti. Two-seat biplane, the Mk II models had canopies covering both cockpits. Three UK based squadrons operated the aircraft.
Wetsland Walrus	1921-25	MR	Napier Lion III	2,270	Wooden frame, linen covering	36	0 (0)	Three-seat biplane spotter, first equipped 3 Squadron RAF at Leuchars before joining FAA Fleet Spotter Flights at Gosport.
Westland Wapiti	1927-39	B, AC, T	Bristol Jupiter VI	1,490	Wooden wings and rear fuselage. Duralumin front fuselage frame. Canvas and metal panel covering.	516	0 (0)	General purpose two-seat biplane employing first of new construction techniques and materials. Extremely reliable, it served in the UK and abroad until 1939.

Table 1.4: British Manufactured Aircraft utilised by the RAF and Fleet Air Arm within the UK 1937-45

Manufacturer/Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Airspeed Horsa	1942-45	Trans, TC	-	3,800	Spruce, plywood covered.	3,655	0 (0)	Principal British assault glider of WW2. Used in Sicily, D-Day, Arnhem and the Rhine Crossing. No complete survivors but several smaller sections.
Airspeed Oxford	1937-54	T	2x AS Cheetah	2,085	Semi-monocoque fuselage, spruce and birch wings, plywood covering.	4,411	6 (2)	Advanced pilot trainer; also utilised on a smaller scale for bombing and gunnery training.
Armstrong Whitworth Albemarle	1941-44	Trans, Tug	2x Bristol Hercules	10,260	Tubular steel frame with spruce and plywood covering	602	0 (0)	First British military aircraft with tricycle undercarriage. Constructed in wood and steel to save on alloys. Used in Sicilian and D-Day airborne campaigns.
Armstrong Whitworth Whitley	1937-44	B, MR, Trans	2x AS Tiger or RR Merlin	8,800	Metal monocoque fuselage, fabric covered wings	1,466	0 (0)	First full production RAF heavy bomber, equipped 4 Group RAF Bomber Command until replaced by Halifax from 1941. Impressed into MR role for the Battle of the Atlantic and later as a glider tug and paratrooper transport.
Avro Manchester	1940-42	B,T	2x RR Vulture	14,150	Metal monocoque fuselage. All metal.	209	0 (0)	First of new generation of RAF heavy bombers to enter service. Revolutionary engines and extensive use of hydraulics caused constant problems. Important precursor to the Lancaster. Relegated to training June 1942.
Avro Lancaster	1942-58	B,MR, ASR	4x RR Merlin or 4x Bristol Hercules (Mk II)	16,750	Metal monocoque fuselage. All metal.	7,377	18 (4)	Principal RAF Heavy Bomber 1942-45. Took part in 1,000 bomber raids, Battles of the Ruhr, Hamburg, Berlin and the raids on Augsburg, the Dams, Peenemunde and Dresden. Relegated to MR and ASR duties postwar. No Mk IIs survive.
Avro York	1943-51	Trans	4x RR Merlin	?	All metal	208	2 (2)	Transport version of the Lancaster. Used extensively post war in the Berlin airlift.
Blackburn Botha	1940-42	TB, GR, T	2x Bristol Perseus	?	All metal	580	0 (0)	Chosen as main torpedo bomber for RAF Coastal Command in 1939. Numerous problems with suitability and handling. Rapidly relegated to training duties.

Manufacturer/Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Blackburn Skua/Roc	1938-42	F, FB, Tug	Bristol Perseus	2,490	All metal stressed skin	326	1 (1)	First FAA monoplane to enter service. A two-seat dive bomber (Skua) of which190 were built shot down the first German aircraft in WWII. The two-seat fighter version (Roc) of which 136 produced was the first FAA aircraft to be equipped with a power operated turret. Both relegated to target tug and training duties by 1941.
Boulton Paul Defiant	1939-45	F,NF, Tug, ASR	RR Merlin	2,722	All metal	267	1 (1)	Battle of France/Battle of Britain fighter with hydraulic gun turret became most significant night fighter in the Blitz, prior to development of AI and GCI. Later became target tug and undertook ASR.
Bristol Beaufort	1938-46	B	2x Bristol Taurus or 2x PW Twin Wasp	5,957	Duralumin, hiduminium and Alclad monocoque fuselage and wings.	2,129	4 (1)	RAF Coastal Command bomber used on shipping strikes 1939-43. Relegated to the Mediterranean 1944 and then the Pacific theatre in 1945.
Bristol Beaufighter	1940-60	F,NF	2x Bristol Hercules or 2x RR Merlins	7,100	All metal monocoque fuselage and wings.	5,928	6 (4)	First purpose-built night fighter; mainstay of night defence 1941-42 and for anti-shipping operations 1942-45. Merlin powered variant very rare.
Bristol Blenheim	1937-44	B,F	2x Bristol Mercury	4,450	All metal	6,260	20 (3)	Night fighter and bomber version used from UK early in war. Suffered heavy losses in France and in the use of 2 Group RAF 1941-42. No fighter versions extant.
De Havilland Don	1937-40	T, Comms	Gipsy King	?	Tubular metal frame, linen covering	50	0 (0)	Single engine monoplane trainer and communications aircraft used in small numbers up to the outbreak of WWII.
De Havilland Mosquito	1941-50	F,B, NF	2x RR Merlin	6,394	Spruce with Plywood and fabric covering	7,781	20 (6)	Significant bomber and multi-role aircraft from 1942. Took part in many famous raids such as attacks on Amiens prison, Gestapo headquarters in Bergen.
Fairey Albacore	1940-45	B	Bristol Taurus II or XII	3,272	Metal monocoque fuselage, fabric covered metal wings.	803	1 (1)	FAA biplane torpedo bomber, operating from aircraft carriers. Intended to replace the Swordfish but superseded by the Barracuda.
Fairey Barracuda	1944-53	B	RR Merlin	3,954	All metal. Steel cockpit frame and engine mounts, remainder alloy monocoque.	2,541	1 (1)	First FAA monoplane torpedo bomber. Replaced Swordfish. Took part in Tirpitz strike.

Manufacturer/Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Fairey Firefly	1943-55	B, MR	RR Griffon	4,422	Alclad monocoque fuselage, stressed skin light alloy wings	1,638	10+ (4)	FAA (mostly carrier borne) two-seat reconnaissance/bomber. Took part in attacks on Tirpitz and Norwegian coast 1944 and in 1945 moved to Pacific theatre.
Fairey Fulmar	1940-44	F	RR Merlin	3,182	All metal stressed skin	600	1 (1)	FAA two-seat carrier borne fighter, first to have eight machine guns. Rapidly outclassed due to lack of speed.
Fairey Swordfish	1936-45	B	Bristol Pegasus	2,406	Tubular steel with canvas an aluminium covering.	2,391	7 (3)	FAA carrier based biplane torpedo bomber. Took part in the attack on Taranto, the sinking of the Bismarck and the Channel Dash.
General Aircraft Ltd Hamilcar	1942-45	Trans	2x Bristol Mercury	8,350 11,580	Spruce with plywood and fabric covering.	432	1 (1)	Principal heavy lift transport glider (only 20 produced with engines) used in the D-Day and Arnhem campaigns.
General Aircraft Ltd Hotspur	1941-45	T	-	1,375	Spruce with plywood covering.	1,061	0 (0)	Principal glider pilot trainer, tandem seats with room in fuselage for troops. Used purely in training by the Army air Corps.
Gloster Gladiator	1937-41	F	Bristol Mercury	1,565	Tubular steel with canvas and aluminium covering.	767	5 (3)	Last RAF biplane fighter. Single-seat with enclosed cockpit. Took part in Norwegian campaign, saw limited use in the BoB. Relegated to service in North Africa and the Mediterranean 1941.
Gloster Meteor	1944-61	F	2x RR Welland or 2x RR Derwent	3,995	All metal stressed skin.	3,875	47+ (42)	First RAF jet fighter to enter service (July 1944) to counter the V-1 flying bomb. Used extensively post war. Wartime versions are rare.
Handley Page Halifax	1940-47	B, Trans	4x RR Merlin or 4x Bristol Hercules	15,340	Light alloy monocoque fuselage.	6,176	2 (1)	Significant heavy bomber from 1941-45. Equipped 4 and 6 Groups RAF Bomber Command in Yorkshire. Successive improvements. Earlier variants relegated to Coastal Command and transport. Took part in all major Bomber Command raids.
Handley Page Hampden / Hereford	1938-44	B, TB	2x Bristol Pegasus or 2x Napier Dagger	5,340	All metal.	1,680	1 (1)	The Hampden and the few Dagger powered Herefords (100) to reach service saw significant use with 5 and 6 Groups Bomber Command in the early war period. Relegated to Coastal Command from 1942-44 as a torpedo bomber.

Manufacturer/Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Hawker Hector	1937-42	AC, Tug	Napier Dagger	1,694	Tubular steel frame,plywood and canvas covering.	178	0 (0)	Interim two-seat biplane replacement for the Audax, last biplane to enter RAF service (with 4 Sq RAF in early 1937). Remained with Auxiliary squadrons until 1940 with a handful of aircraft carrying out dive bomber attacks against Germans in that year. Relegated for use as glider tug within the UK.
Hawker Henley	1938-	Tug	RR Merlin	?	Tubular steel frame, plywood and canvas covering.	200	0 (0)	Initially conceived as a light bomber but on delivery was immediately relegated as a target tug working with Air Firing and Anti-Aircraft Co-operation units.
Hawker Hurricane	1937-45	F,FB	RR Merlin	2,118	Tubular steel and aluminium alloy fuselage frame with light wooden formers and canvas covering. Steel and stressed aluminium alloy wings.	14,533	45+ (29)	Most numerous RAF fighter in Battle of Britain, from 1941 relegated to Mediterranean and Far East in fighter bomber and anti-shipping roles. Also adapted as a convoy protection fighter on Russian and Atlantic routes, launched from Merchantmen. Served on 17 battlefronts including Battle of France, Norway, Battle of Britain, Malta, North Africa, Sicily, Adriatic and Burma campaigns.
Hawker Tempest	1944-48	F,FB	Napier Sabre	4,128	All metal.	1,401	20+ (5)	Late war RAF fighter, one of the last with a piston engine. Took part in the V1 campaign and saw combat against German jets.
Hawker Typhoon	1941-45	F,FB	Napier Sabre	3,992	All metal.	3,330	1 (1)	Principal RAF fighter-bomber from 1943-45. Played major tactical role in the NW Europe ground campaign from the invasion of Normandy until the end of the war.
Miles Magister	1937-45	T	DH Gypsy	?	Spruce and plywood.	1,227	14 (8)	Training and communications aircraft.
Miles Master / Martinet	1939-50	T	Bristol Mercury or PW 1535	1,950	Spruce and Plywood covering.	4,835	1 (1)	Advanced pilot trainer which equipped secondary flying training schools and also saw limited use as a target tug for gunnery practice.
Percival Petrel	1939	Comms	2 x DH Gipsy Six	?	Tubular metal frame, canvas and metal covering	8	0 (0)	Twin engine communications aircraft which saw limited use with 24 Sq RAF.
Percival Proctor	1939-50	T, Comms	DH Gipsy Queen	1,076	Spruce and plywood, fabric covered.	912	13 (6)	Communications aircraft.

Manufacturer/Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Short Stirling	1941-46	B, Trans RCM	4x Bristol Hercules	17,659	All metal.	2,374	0 (0)	The first of the RAF's four engine heavy bombers to enter service. By mid 1943 it had been relegated from the primary bombing role due to its limited service ceiling and heavy losses. Reused as a transport, glider tug and by 100 Group RAF in the Radio Counter Measures or electronic warfare role.
Short Stranraer	1935-41	MR	2x Bristol Pegasus	?	Metal and fabric covering.	17	1 (1)	Pre-war flying boat. Some use by Coastal Command at outbreak of war.
Short Sunderland	1938-56	MR	4x Bristol Pegasus or 4x PW R 1830	15,663	All metal.	739	8 (4)	Flying boat. Principal maritime reconnaissance and anti-submarine aircraft in use with RAF Coastal Command. Operated in all theatres but particularly successful in the battle of the Atlantic due to its heavy armament and long endurance.
Supermarine Spitfire/Seafire	1938-50	F	RR Merlin or RR Griffon	2,545	All aluminium monocoque fuselage and wings.	22,928	300+ (59)	Principal RAF day fighter from early 1941 until the end of the war. Operated in all theatres and in all major campaigns and also adapted for use on aircraft carriers as the Seafire.
Supermarine Walrus/Sea Otter	1939-45	ASR	Bristol Pegasus	2,220	Spruce and plywood covering.	740	3 (3)	Flying boat. Principal air sea rescue aircraft. Saved at least 6,000 aircrew.
Vickers Warwick	1943-46	MR, ASR Trans	2x Bristol Centaurus	12,700	Aluminium and steel geodetic structure with fabric covering.	700	0 (0)	Intended replacement for the Wellington. Used mainly by RAF Coastal Command for ASR and MR duties, also subsequently as a transport.
Vickers Wellington	1937-53	B,T, MR	2x Bristol Hercules	8,400 - 12,000	Aluminium and steel geodetic structure with fabric covering.	11,461	2 (2)	Principal RAF heavy bomber 1939-42, prior to advent of the four- engine heavies. Relegated to Mediterranean and Operational Training Units 1941-44. Limited use by Coastal Command. Took part in the first bombing raid of the war.
Westland Lysander	1938-47	AC	Bristol Perseus	1,840	Metal and fabric covering.	1,898	9 (4)	Used in the Army co-operation role and subsequently for operations with the Resistance and SOE in France.
Westland Whirlwind	1940-43	FB	2x RR Peregrine	3,699	All metal.	112	0 (0)	Innovative fighter-bomber. Suffered engine problems and only ever equipped two squadrons, used in support of bombing operations and for attacks on France.

Table 1.5: US Manufactured Aircraft utilised by the RAF and FAA within the UK 1939-45

Manufacturer/ Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Bell Aircobra	1941-42	F	Allison V12	2,540	Stressed aluminium	9,588	10 (0)	Innovative mid-engine fighter aircraft with tricycle undercarriage, approximately 50 of which entered RAF service with 601 Sq.
Boeing Fortress	1941-46	B, MR, RCM	4x Wright R-1820	14,855	All metal semi-monococque fuselage	12,731	23 (3)	220 of various versions delivered for RAF use. Initially operated 1940-41 in daylight bombing tests, subsequently used by Coastal Command and 100 Group Bomber Command in early RCM role.
Brewster Bermuda	1943-45	Tug	Wright Cyclone	4,440	All metal.	1,000+	0 (0)	Ordered as a land-based dive-bomber, 950 were delivered for RAF service, most of which are believed to have served in the UK as target tugs and none are known to have flown operationally.
Brewster Buffalo	1941-42	F	Wright Cyclone	2,100	All metal.	447	5 (0)	Pre-war USAAC fighter. 209 delivered to RAF/FAA, of which only 28 are believed to have operated in UK, the remainder going to the Far East.
Chance Vought Corsair	1943-45	F	Pratt and Whitney Double Wasp	4,025	All metal.	12,571	60 (4)	Carrier-based fighter, 2,012 of which were supplied for FAA use. Mostly saw action in the Pacific and Far East, but a few operated within the UK.
Consolidated Catalina	1941-45	MR,A SR	2x PW R1830	9,938	All metal.	4,000+	69 (3)	Long-range flying boat, 771 of which were delivered to the RAF/RCAF/RAAF/RNZAF. Equipped 9 UK-based Squadrons of RAF Coastal Command in the anti-U Boat and reconnaissance role.
Consolidated Liberator	1941-47	B, MR	4x PW R1830	16,556	All metal except fabric covered control surfaces.	19,203	15 (2)	1,865 delivered for RAF use (mostly in Far East). Used in the UK by RAF Coastal Command in the maritime reconnaissance/anti-submarine role.

Manufacturer/ Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Curtiss Seamew	1941-44	T	Ranger SGV	1,869	All metal stressed skin.	800	0 (0)	Two-seat single engine reconnaissance aircraft. Approximately 250 scheduled for delivery to the FAA on lend lease, but only approximately 100 actually received. Saw no operational service and from 1943 operated in the training role, some serving with training squadrons at Worthy Down, Hants.
Curtiss Tomahawk	1941-43	T, AC	Allison V1710	2,636	All metal.	1,400	10 (0)	Approximately 1,180 taken on strength by RAF, RAAF and SAAF for use in North Africa and Far East. Used in limited capacity in UK.
Douglas Boston/Havoc	1940-46	B, NF	2x Pratt and Whitney Twin Wasps or 2x Wright R2600	5,172	All metal.	7,385	14 (1)	A total of 1,250 Boston light bombers were delivered to the RAF (used in UK with 2 Group and later 2 Tactical Air Force). Also 100 night fighter versions (Havoc) used by RAF.
Douglas Dakota	1942-50	Tug, Trans, TC	2x PW R1830	7,657	All metal.	10,691	550 (16)	Conversion of pre-war civilian airliner type. A total of 1,920 delivered for RAF use and became the principal transport aircraft. Took part in the D-Day and Arnhem campaigns and saw action in all theatres.
Grumman Avenger	1943-46	TB	Wright R2600	?	All metal. Semi monocoque fuselage.	9,836	60 (3)	Three seat carrier based torpedo bomber. From 1943 onwards 957 delivered to FAA (initially known as Tarpon), of which it equipped 9 squadrons. Use in all theatres.
Grumman Hellcat		F	Pratt and Whitney Double Wasp	4,101	All metal.	12,275	22 (3)	1,262 supplied to FAA as replacement carrier borne fighter under lend-lease. Initially called the Gannet. Served 1943-45. Served in all theatres.
Grumman Martlet/Wildcat	1940-45	F	Wright Cyclone	2,011	All metal.	7,316	35 (4)	531 supplied to FAA as carrier borne fighter, (known initially as Martlet). Served 1940-44. Took part in Norwegian campaign with great success.

Manufacturer/ Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe construction	Total Produced	Survivors: Global (UK)	Notes
Lockheed Ventura	1942-44	B, MR	2x PW Double Wasp	7,836	All metal.	2,070+	15 (1)	781 delivered for RAF service, initially with Bomber Command as daylight medium bombers. After heavy losses relegated to Coastal Command.
North American Harvard	1942-56	T	PW Wasp or A1340	2,549	Steel frame fuselage, fabric and ply, later alloy covered.	9,577+	400 (23)	5,125 delivered for RAF and commonwealth usage as trainers. Equipped many Flying Training Schools in the UK and abroad.
North American Mitchell	1942-45	B	2x wright Cyclone	9,208	All metal.	9,816	45 (5)	Total of 837 delivered to RAF. Used in the UK by 4 Squadrons of 2 Group RAF as medium tactical bomber and later by the 2 TAF.
North American Mustang	1942-47	FB, AC	Allison 1710 or RR Merlin	2,858	All metal.	15,586	257 (8)	2,517 delivered for RAF use. Initially ordered as a fighter, mostly used by 2 TAF in the fighter bomber/Army Co-operation role.
Stinson Reliant	1944-45	T	Lycoming R680	1,276	Tubular steel and duralumin frame, duralumin and canvas covering.	?	10 (0)	High-wing monoplane which first appeared in 1933, with 500 delivered to FAA for use as navigation trainers and communications aircraft under the lend-lease arrangement.
Vought Sikorsky Chesapeake	1941-44	T	PW R1835 Twin Wasp Junior	2,256	Tubular metal fuselage with canvas covering, metal wings.	165	1 (0)	50 delivered for FAA use within the UK, flying from Lee-on-Solent and Arbroath. Tried operationally, quickly relegated to training with little significant use.
Vultee Vengeance	1941-47	Tug	Wright Cyclone	4,672	All metal.	1,000	2 (0)	Intended as a dive-bomber 1,362 delivered to the RAF. Found inadequate for European theatre and the 500 within the UK subsequently used as target tugs.
Waco CG4A Hadrian	1942-45	Trans, TC	-	1,721	Tubular steel fuselage, wooden wings, fabric covering.	13,909	3 (1)	US designed assault glider, 1,095 of which were delivered for use by British Airborne forces.

Table 1.6: USAAF and USN Aircraft operating within the UK 1939-45

Manufacturer / Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe Construction	Total Produced	Survivors : Global (UK)	Notes
Bell P39 Aircobra	1942-43	F	Allison V1710	2,545	All metal.	9,588	10 (0)	Unusual mid-engine fighter which saw extremely limited use with the VIII AAF. Used mostly in the Pacific.
Boeing B17 Fortress	1942-45	B	4x Wright R1820	15,422	All metal semi-monococque fuselage	12,731	23 (3)	Mainstay daylight high-altitude heavy bomber used by 1st and 3rd Air Divisions of the VIII AAF 1942-45. Took part in all major raids.
Consolidated B24 Liberator	1941-45	B	4x PW R1830	16,556	All metal except fabric covered control surfaces.	19,203	15 (2)	Daylight high-altitude heavy bomber used by the 2nd Air Division, VIII AAF 1942-45. Also limited night use dropping agents, supplies etc and with the USN.
Douglas A20 Havoc	1942-45	B, Tug	2x Wright R2600	6,727	All metal.	7,385	14(1)	Light bomber used in extremely limited fashion by VIII AAF. Took part in the first US raids of the war from UK. Subsequently equipped three groups of IX AAF in UK.
Douglas A26 Invader	1944-45	B	2x PW R2800	10,365	All metal.	?	25 (0)	Medium bomber replacement for A20 and B26 from late 1944. Saw limited actual use in the UK, mostly equipping IX AAF units in mainland Europe.
Douglas C47 Skytrain	1942-45	Trans, Tug, TC	2x PW R1830	7,698	All metal.	10,691	550 (16)	Principal US transport and troop carrier. Operated by the IX AAF during the D-Day and Operation Market Garden campaigns.
Lockheed P38 Lightning	1942-44	F	2x Allison V1710	5,563	All metal.	8,300	18 (0)	Twin boom, twin-engine fighter aircraft, principal long-range escort July 1942 until the intro of the P47 (1942) and the P51 (1943). Withdrawn Sept 1944.
Martin B26 Marauder	1942-46	B	2x PW R2800	10,152	All metal.	4,500	5 (0)	Medium (and medium level) bomber operated successively by the US VIII and IX AAFs in the tactical role.

Manufacturer / Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe Construction	Total Produced	Survivors: Global (UK)	Notes
Noorduyn UC64 Norseman	1944-45	Comms	PW R1340	1,928	Metal frame with fabric covering.	?	25 (0)	Communications aircraft, converted from civilian model. Chiefly famous for being the type in which Glen Miller went missing late 1944.
North American P51 Mustang	1942-45	F	Allison 1710 or RR Merlin	2,858	All metal.	15,586	257 (8)	Principal USAAF fighter, equipping VIII and IX AAF from winter of 1943-44. VIII AAF operated as a long range escort, IX AAF in the tactical role.
Republic P47 Thunderbolt	1942-45	F, FB	PW Double Wasp	4,087	All metal	15,660	150 (2)	Important fighter with VIII and IX AAF from Dec 1942 until the end of the war. Initially used as an escort, increasingly fulfilled fighter-bomber role.
Waco CG4A	1942-45	Trans, TC	-	1,721	Tubular steel fuselage, wooden wings, fabric covering.	13,909	3 (1)	Principal US transport and troop-carrying glider, used in the Sicilian, D-Day and Market Garden airborne campaigns.

Table 1.7: Luftwaffe and Regia Aeronautica Aircraft operating over the UK 1939-45

Manufacturer / Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe Construction	Total Produced	Survivors: Global (UK)	Notes
Bf 109 (Messerschmitt)	1937-45	F,FB	DB601 or 605	2,354	All metal.	35,000	45 (8)	Most significant fighter used over southern England during the Battle of Britain. From 1942-43 replaced by the FW190.
BF 110 (Messerschmitt)	1938-45	F, NF	2x DB605	5,094	All metal.	6,050	6 (1)	Significant twin-engine heavy fighter aircraft in the Battle of Britain. Operated over the West Country, southern England and east coast as far north as the Shetlands.
Dornier 17/215	1937-42	B	2x BF	5,210	All metal.	1,700	0 (0)	Significant medium bomber in the Battle of Britain and early Blitz period.
Dornier 18	1935-41	MR	2x JJ 205	5,850	All metal.	100	0 (0)	Operated in UK coastal waters, some lost on operations.
Dornier 217	1941-44	B	2x DB 603	9,065	All metal.	1,905	0 (0)	Significant later war bomber operating over UK.
Focke Wulf 190	1941-45	F, FB	BMW 801	3,470	All metal.	20,051	7 (2)	Used as a fighter-bomber in so-called `sneak raids' over the southern coast 1942-44.
FZG 76	1944-45	-	Argus 109.014	2,180	Sheet steel, light alloy and plywood.	5,000+	16 (8)	Pilotless bomb, commonly known as the V1. Used in campaign against Britain June 1944 to March 1945. Carried 850kg warhead of HE. Ground and air launched.
Heinkel 111	1936-45	B	2x JJ 211 or 2x DB 601	8,680	All metal.	7,300	3 (1)	Main medium/heavy bomber from Spanish Civil War until end of WW2. From mid 1944 used to launch V1s.
Heinkel 177	1944-45	B, MR	2x DB 610	16,800	All metal.	1,169	0 (0)	Heavy bomber, made debut over England in January 1944 during the `Little Blitz'. Novel engine layout and unreliability caused constant problems.
Messerschmitt 210/410	1941-45	F,FB	2x DB 603	6,148	All metal.	352/ 1,121	1 (1)	Intended replacement for Me110, under-powered as day fighter and operated as night fighter over England 1943-45.

Manufacturer / Type	Period of Service	Role	Power Plant	Weight (Kg)	Airframe Construction	Total Produced	Survivors: Global (UK)	Notes
Heinkel 115	1936-45	ASR	2x BMW 312	6,700	All metal.	400+	1 (0)	Operated in MR and ASR role in UK coastal waters.
Junkers 86	1936-42	B, GR	2x JJ 207	6,700	All metal.	810-1,000	0 (0)	High altitude GR and B versions operated over southern England 1941-42.
Junkers 87	1937-45	B	JJ 211	3,900	All metal.	5,709	4 (1)	Dive-bomber. Successful in Poland and France, heavy losses in Battle of Britain. Withdrawn from NW Europe 1941 for use in Russia and Mediterranean.
Junkers 88	1939-45	B,NF	2x JJ213	11,000	All metal.	14,980	3 (1)	Multi-role aircraft. Used as bomber and dive-bomber in the Battle of Britain and became night fighter later in war.
Junkers 188	1943-45	B	2x JJ 213 or 2x BMW 801	?	All metal.	1,100	0 (0)	Operated over UK 1944 onwards as a night intruder.

Key to Tables

Period of Service: total period of service with respective air force (as opposed to period of usage over the UK - see Notes column).

Role: the military role in which the aircraft was utilised (often not the role for which it was designed). AC=Army Co-operation, ASR=Air Sea Rescue, B=Bomber, Comms=Communications, F=Fighter, FB=Fighter Bomber, GR=General Reconnaissance, MR= Maritime Reconnaissance, NF=Night Fighter, RCM=Radio Countermeasures, TB= Torpedo Bomber, T=Trainer, TC=Troop Carrier, Trans=Transport, Tug=Glider/Target Tug

Power plant: AS=Armstrong Siddely, BF=Bramo Fafnir, DB=Daimler Benz, DH=De Haviland, JJ=Junkers Jumo,PW= Pratt and Whitney , RR=Rolls Royce

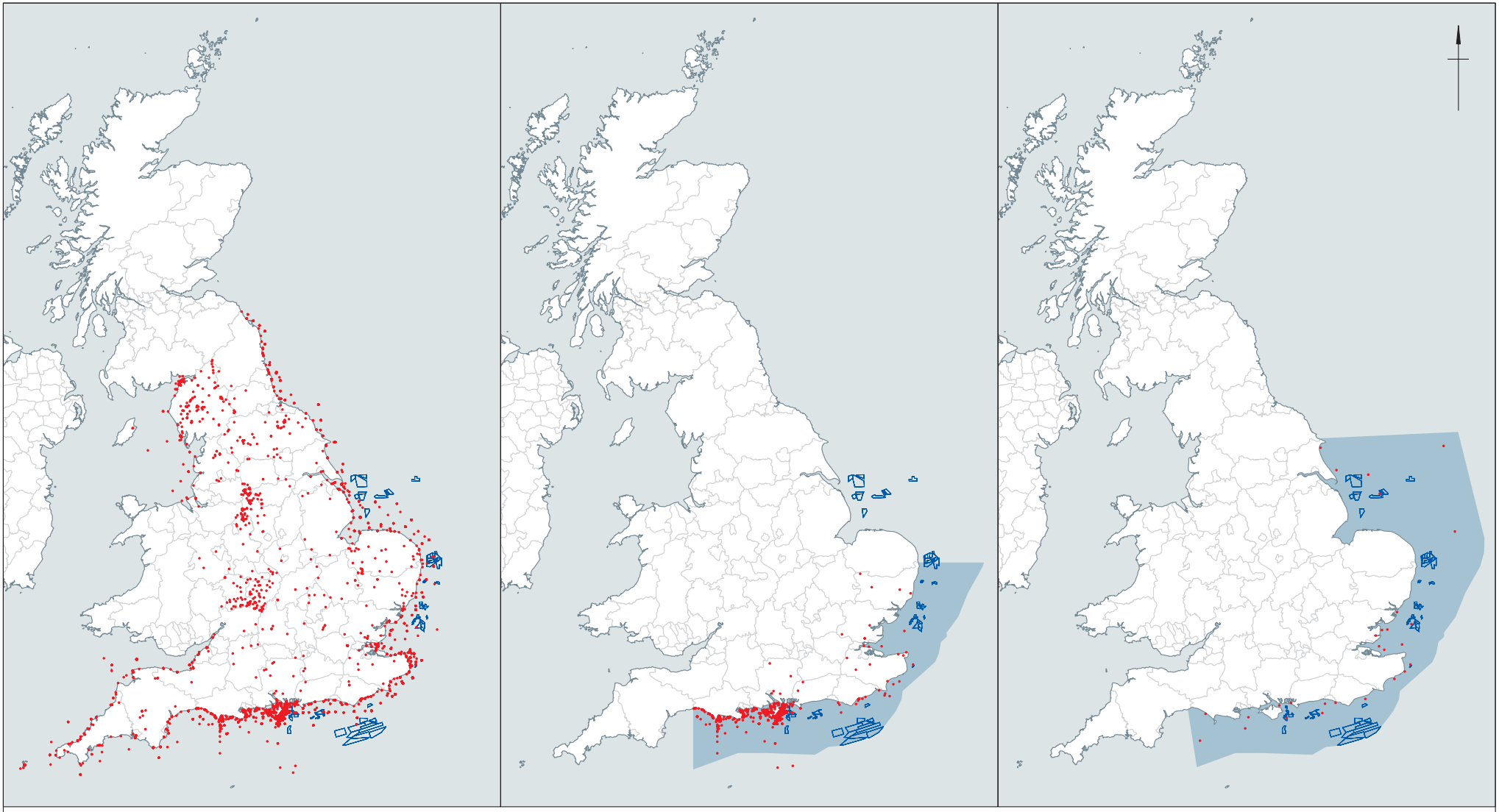
Weight: Total weight of airframe and engines, unloaded. Intended to give general indication of relative size.

Airframe Construction: Basic data on construction and major materials, where known.

Numbers: (1)=Total Produced, (2)=Number of complete airframes (ie. more than 66% intact) known to survive globally (inclusive of UK), figure in brackets = number surviving within UK. Global figures represent estimates, UK figures accurate and based upon 16th edition of Wrecks and Relics (Ellis 1998).

Notes: General information on background, importance and currency (ie. use within UK). In the case of British and Luftwaffe aircraft, intended to provide basis for the Scope Notes attached to NMR Thesaurus of Monument Types.

APPENDIX X: DRAFT INTERIM GUIDANCE FOR THE MARINE AGGREGATE INDUSTRY



A: Known aircraft sites (NMR/SMR/HER data)

B: SMR and HER known aircraft sites

C: UKHO known aircraft sites

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Record search area

Licenced dredging area

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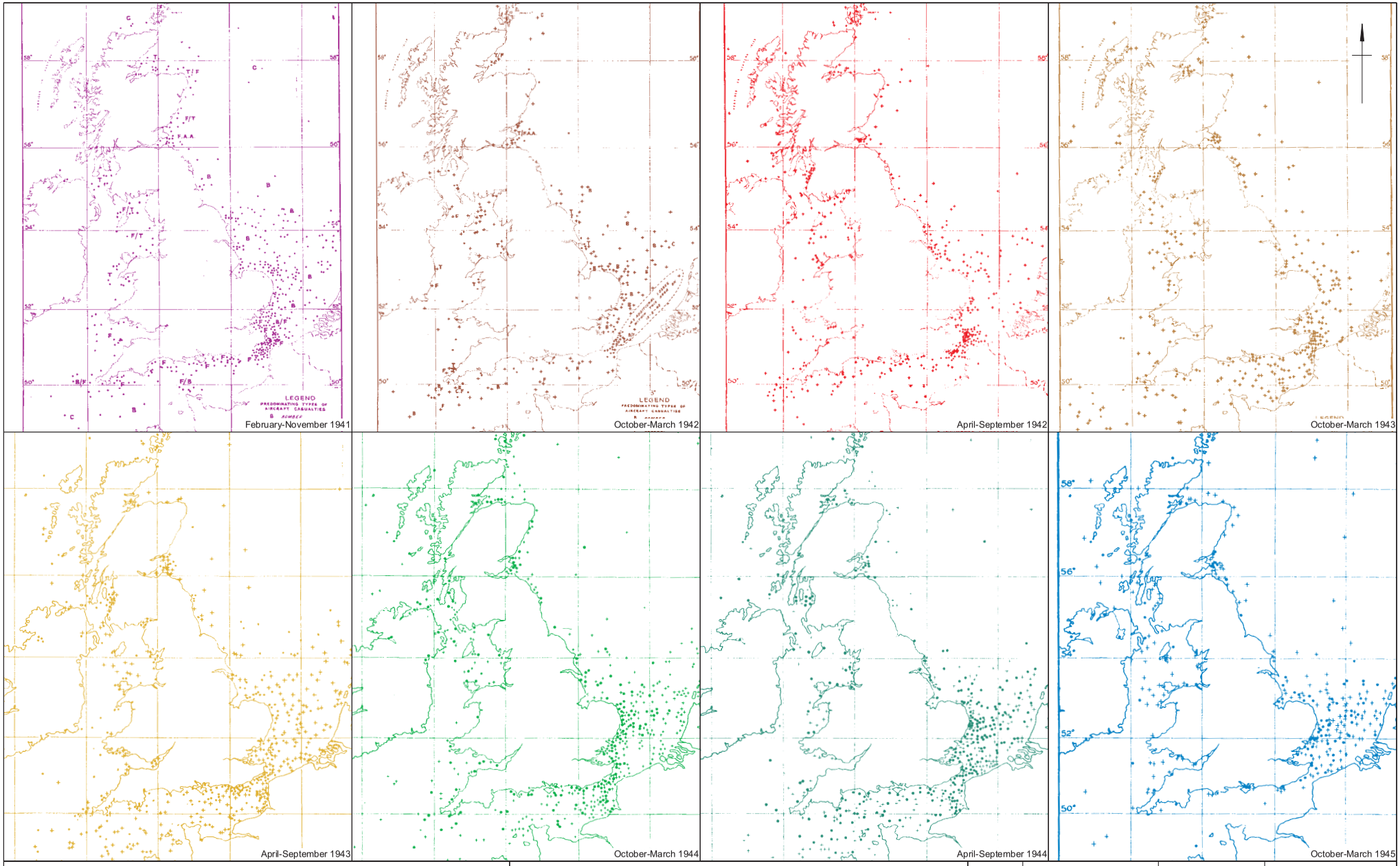
NMR, HER, SMR and UKHO aircraft crash sites

Figure 1



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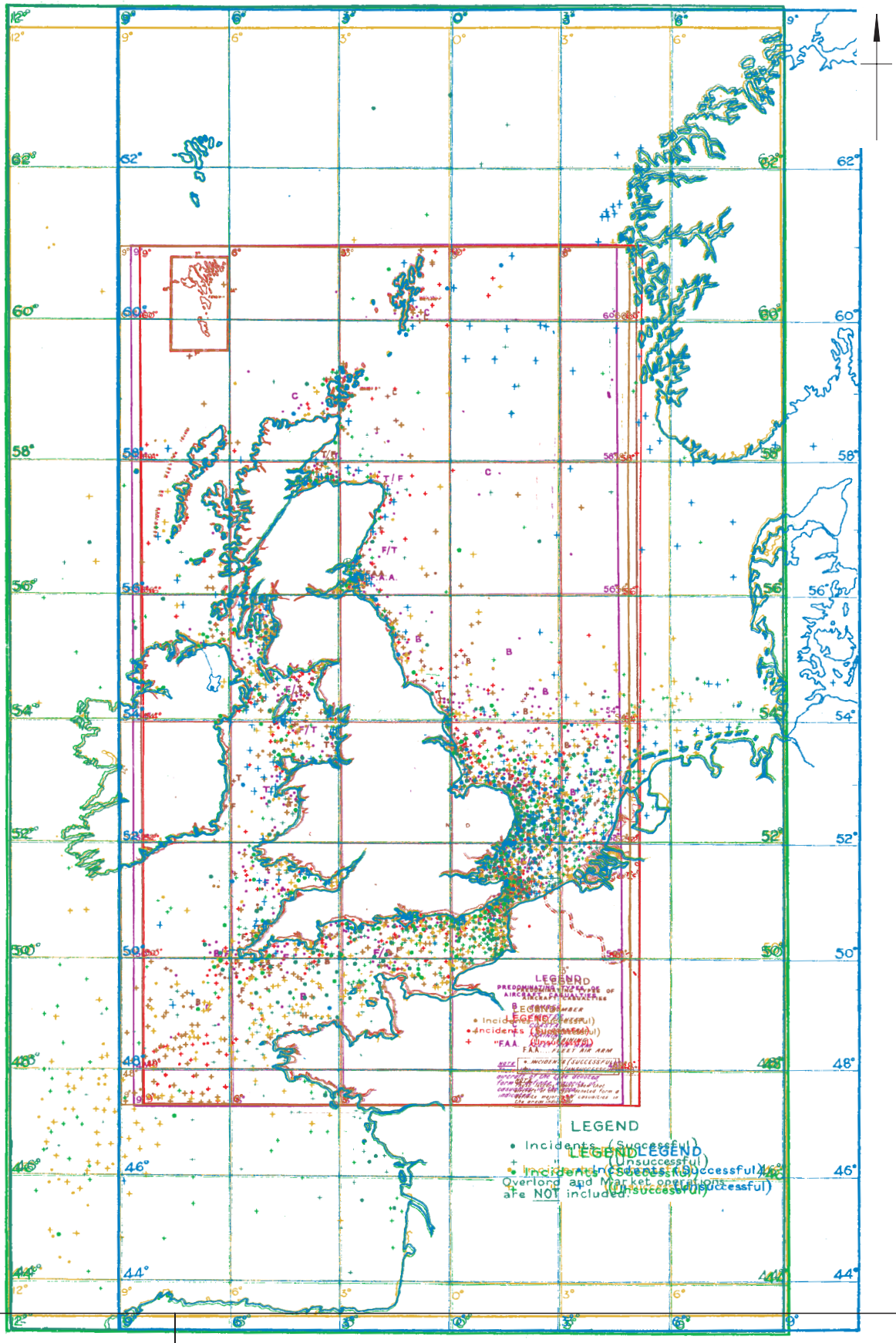
Distribution of WWII British Air/Sea Rescue operations

Figure 2



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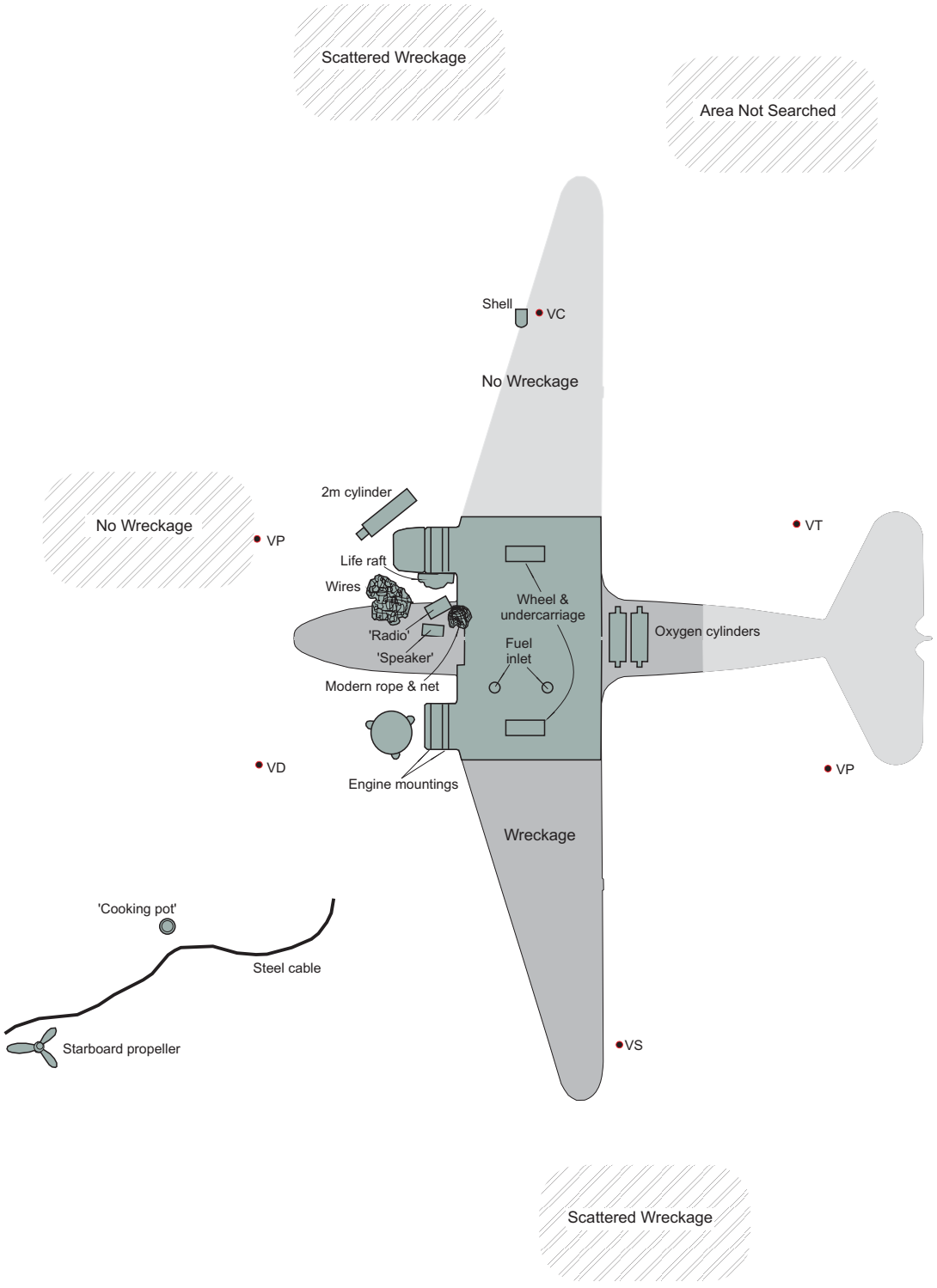
Distribution of WWII British Air/Sea Rescue operations combined

Figure 3



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Q. Detail of port engine

P. Rear face of port engine

N. 'Cooking pot'

M. Starboard propeller, boss down

A. Detail of 2m cylinder

B. Undercarriage elements

C.

D.

E. Gas cylinders,
showing inlet/ outlet

F. Base of rear fuselage

G.Gas cylinders

H. Corrugated inner wing surface

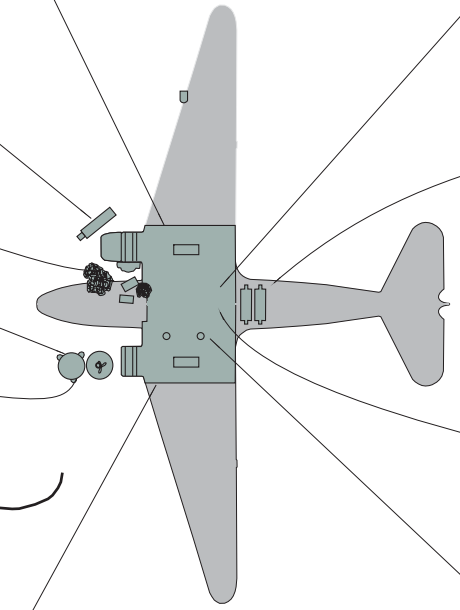
O. Propeller beneath port engine

L.Cross-section of wing

K.

J.

I.



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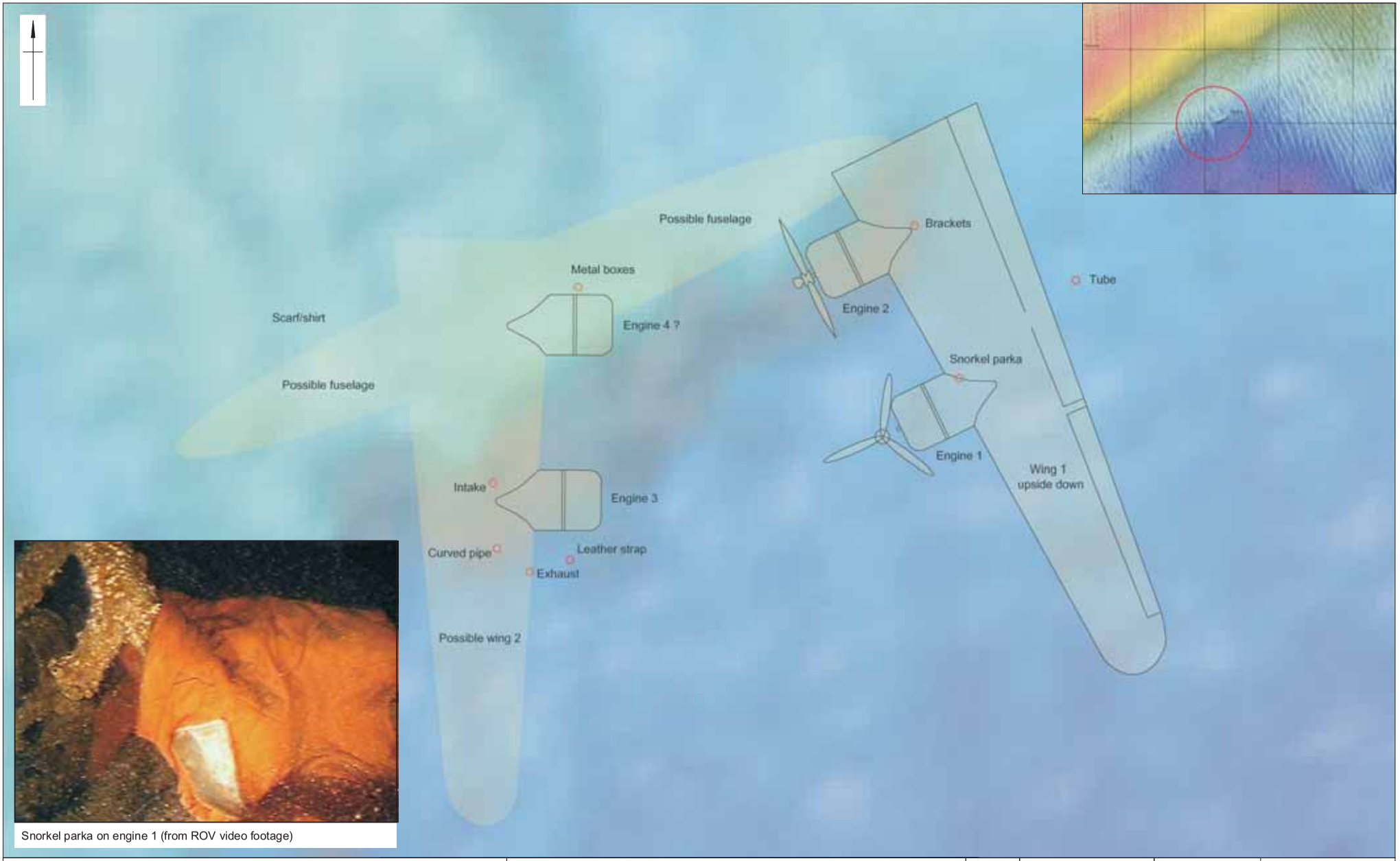

Snorkel parka on engine 1 (from ROV video footage)

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B-24 Liberator site, ROV survey overlain on multibeam swath bathymetry (overview inset top right)

Figure 6

Plate A: Photographs of a Pratt & Whitney R-1830 Twin Wasp engine

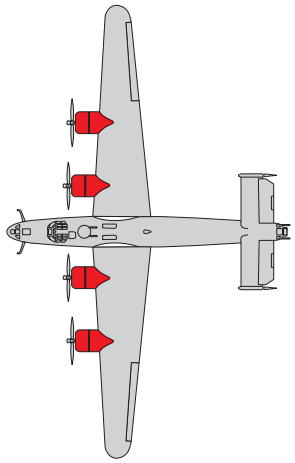

Plate B: Close-up view of twin row cylinders on engine 1.

Plate C: Details of cylinders and exhaust collector ring on engine 2.

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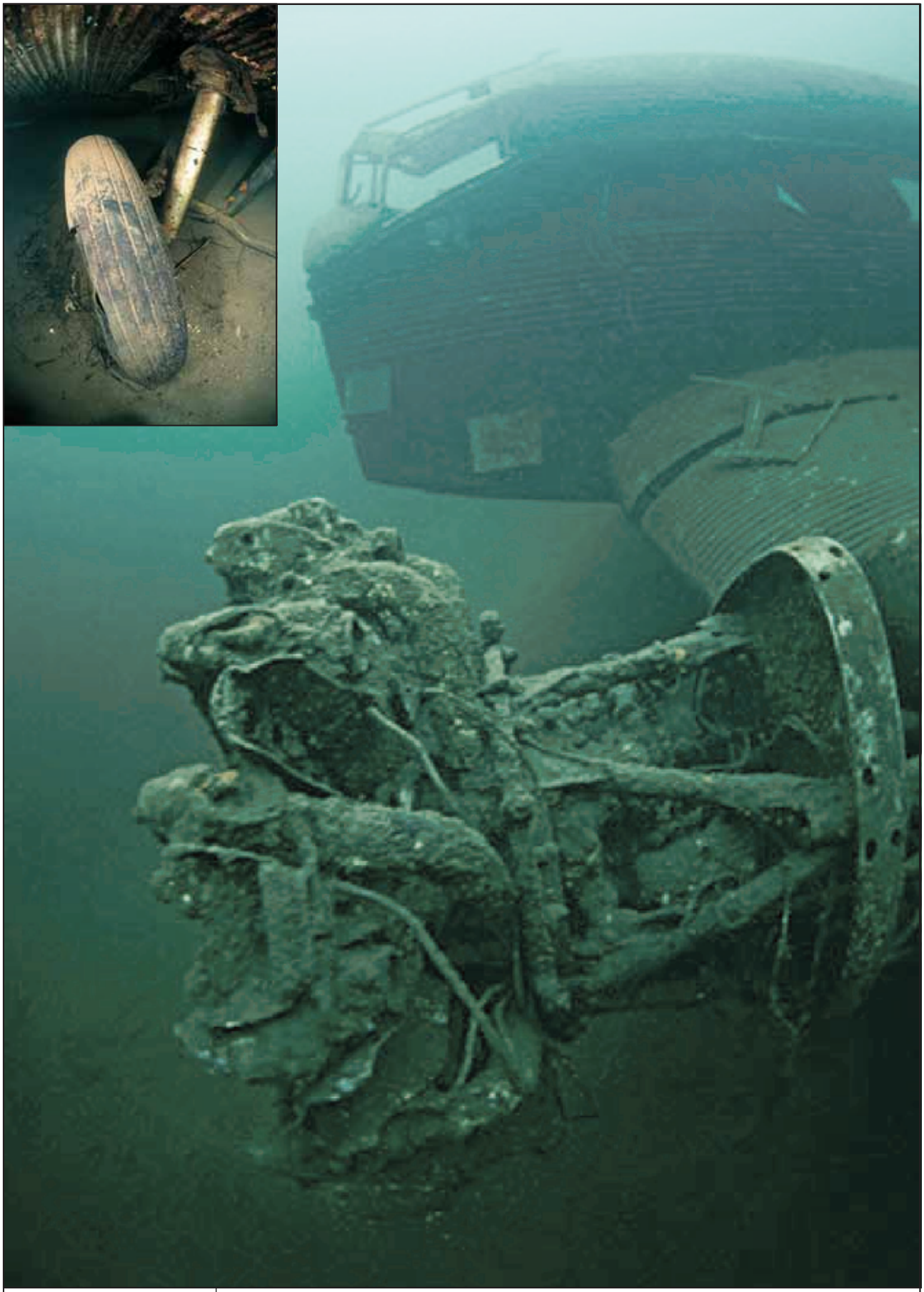
B-24, comparison of engines on site with preserved examples

Figure 7



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Luftwaffe Ju 52 in Norwegian Lake, inset starboard landing gear (© Simon Brown)

Plate 1

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USAAF P-38F, Harlech Beach (© TIGHAR)

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Saddle magazine from an MG 15 and human bone - right humerus (upper arm), recovered in Area 430

A: Consolidated B-24 Liberator

B: Junkers Ju 88

C: Short Sunderland
(courtesy of Pembrock Dock Sunderland Trust)

D: Lockheed P-38
(courtesy of Armchair Aviator)

E: Douglas C-47
(courtesy of TM Wolf)

F: Junkers Ju 52
(courtesy of K Weaver)

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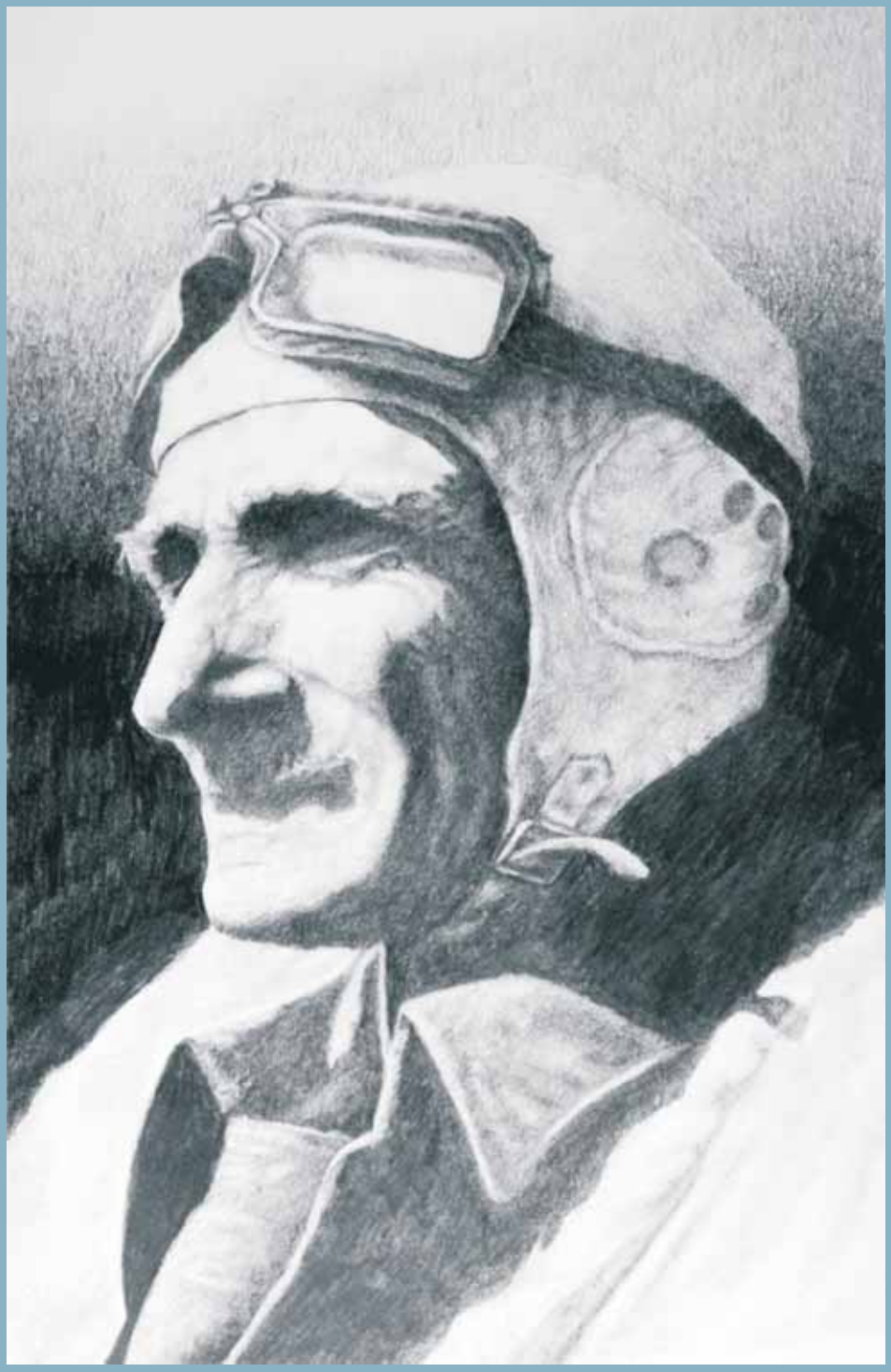

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