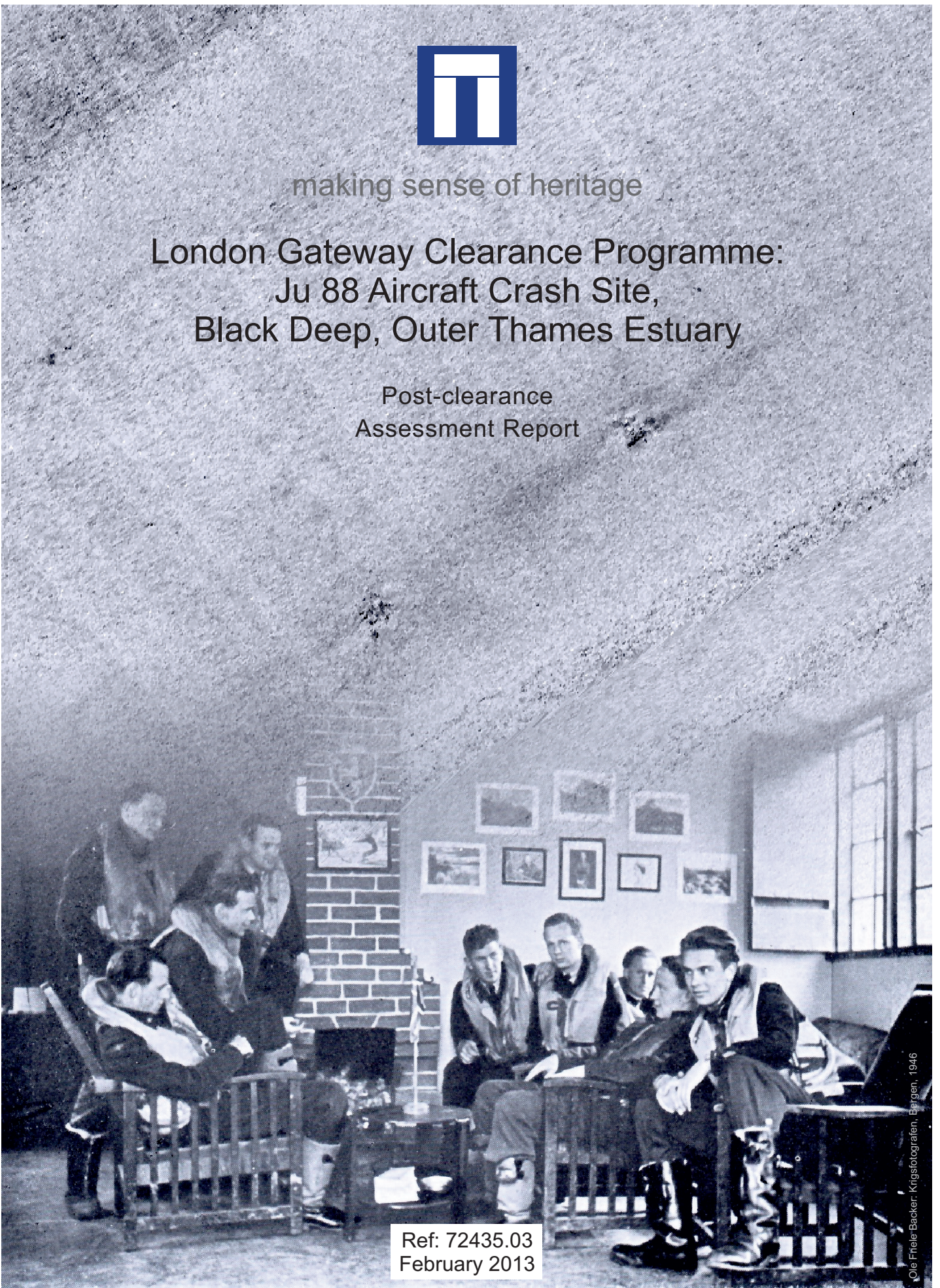




making sense of heritage

London Gateway Clearance Programme:  
Ju 88 Aircraft Crash Site,  
Black Deep, Outer Thames Estuary

Post-clearance  
Assessment Report



Ref: 72435.03  
February 2013

Ole Friele Backer: Krigsfotografen, Bergen, 1946



**JU 88 AIRCRAFT CRASH SITE,  
BLACK DEEP,  
OUTER THAMES ESTUARY**

**Post-clearance Assessment Report**

Prepared for:  
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**February 2013**

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**LONDON GATEWAY CLEARANCE PROGRAMME:  
JU 88 AIRCRAFT CRASH SITE,  
BLACK DEEP,  
OUTER THAMES ESTUARY**

**Post-clearance Assessment Report**

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**LONDON GATEWAY CLEARANCE PROGRAMME:  
JU 88 AIRCRAFT CRASH SITE,  
BLACK DEEP,  
OUTER THAMES ESTUARY**

**Post-clearance Assessment Report**

**Summary**

Wessex Archaeology was commissioned by DP World London Gateway, to carry out clearance under archaeological supervision at a previously unknown aircraft crash site in the Black Deep, Outer Thames Estuary, at (WGS84 UTM31z) 385130 E, 5720611 N and 385151 E, 5720625 N. This Assessment reports on fieldwork undertaken on the 5th and 6th July 2012 which covered the area of two geophysical anomalies (7534 and 7535) which had been confirmed to be the source of aircraft related material.

The Site, which includes the two geophysical anomalies identified during previous survey, contained significant quantities of aircraft related material. The concentration of material was demonstrated to have largely originated from a Junkers 88 T - although not exclusively - that crashed on 20th April 1943 as the result of the actions of an RAF Spitfire from 332 Sqn. Due to the rarity of the aircraft variant, the connection to a very secretive specialist *Luftwaffe* squadron, and the link to at least one historical figure, this discovery is of international significance and provides a rare opportunity to examine the remains of a exceptional aircraft which will reveal evidence for technological innovation during a period of intensive European and World conflict in the mid-20th century.

The archaeological fieldwork produced significant amounts of aircraft structure and certain components that demonstrated the uniqueness of the find. It utilised a gas boost system consuming nitrous oxide to increase engine power and speed at altitude in an attempt to allow it to outrun enemy fighters. This system, used on the BMW 801 power-plant, was only used on a limited number of late-war variants of the Ju 88. In addition, camera equipment recovered from the site was of a type that was only used on a very few Ju 88 variants, including this T prototype. Study of contemporary documentary sources also corroborates the identification of the aircraft variant.

The only survivor of the crash, the pilot - Ltn Hans Bäumer - attempted to hide the true identity of the aircraft during interrogation and was partially successful. Cross referencing his feldpostnummer shows that he was based at Aalborg in northern Denmark. Here, the secretive *1 Staffel, Versuchsverband Oberbefelshabers der Luftwaffe* (Experimental Unit of the Commander-in-Chief of the Air Force) operated a range of prototype, experimental and specialist aircraft. It is probable that Bäumer was a test pilot for the *Luftwaffe*, and possibly for Junkers. The resistance may have been involved with providing information to the RAF that ultimately led to the Ju 88 being intercepted and shot down.

The pilot that shot down Bäumer's aircraft was Marius Eriksen, a 21 year old Norwegian fighter ace who had escaped from Nazi occupied Norway in 1940 and joined the Norwegian staffed 332 Sqn RAF based at RAF North Weald in Essex. He was later shot down over France, captured and spent the rest of the war in *Stalag Luft III* in Poland, which was famously depicted in the 1963 film *The Great Escape*, until his release in 1945.

Other material found at the crash site appears to be the remains of another aircraft. A propeller and other items point to the remains of a British aircraft, possibly a Westland Lysander.

A publication programme will result in both academic and popular publication of the results in order to disseminate the findings to professional bodies, interest groups and the public.

**LONDON GATEWAY CLEARANCE PROGRAMME:  
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The project was managed for Wessex Archaeology by Toby Gane. Graham Scott carried out the watching brief with the assistance of UK Dredging and the PLA. Finds processing and recording were carried out by Phil Harding, Neil Fitzpatrick, Dave Murdie, Piotr Orczewski, Matt Kendall, Kev Stratford and Dan Pascoe.

This report was written and compiled by Toby Gane and Graham Scott with assistance from Gareth Jones and Philippa Hodgkiss acting on behalf of Airframe Assemblies Ltd. The illustrations were produced by Kitty Foster.



**LONDON GATEWAY CLEARANCE PROGRAMME:  
JU 88 AIRCRAFT CRASH SITE,  
BLACK DEEP,  
OUTER THAMES ESTUARY**

**Post-clearance Assessment Report**

**1 INTRODUCTION**

**1.1 Introduction**

1.1.1 Wessex Archaeology (WA) was commissioned by DP World London Gateway (hereafter 'London Gateway') to undertake an archaeological watching brief of the clearance by means of grab dredger of geophysical anomalies **7534** and **7535** (hereafter 'the Site'). These anomalies, first detected as a result of geophysical survey following a dredge strike, were confirmed to be aircraft wreckage by diving investigation in 2012.

1.1.2 The anomalies were located in Zone 105 of the London Gateway dredging area at Black Deep, Outer Thames Estuary (**Figure 1**) at the following co-ordinates:

<b>7534</b>	<b>7535</b>
385130 E	385151 E
5720611 N	5720625 N

**Table 1: Site Co-ordinates (WGS 84, UTM z.31N)**

1.1.3 Consent had been granted for the development of London Gateway Port and the associated navigation channel with a condition that a programme of archaeological mitigation was undertaken both prior to and during the development works. A Protocol for Archaeological Discoveries (PAD) and archaeological monitoring during dredging formed an important element of that mitigation.

1.1.4 A report on the watching brief has previously been prepared by WA (WA 2012). This report presents an initial interpretation of the finds recovered during the clearance and previous diving operations. Proposals and recommendations for further analysis and publication are also included.

**2 BACKGROUND**

2.1.1 During dredging operations throughout 2010 and 2011 a range of finds were recovered from various locations in the navigation channel. Some of these are considered to be of some archaeological significance. A report outlining strikes during dredging and the correlation of finds with known anomalies and dredging track-plots was produced in order to try to identify the sources of some of the dredging finds (Wessex Archaeology 2011).

2.1.2 Amongst the dredging finds were 45 pieces of what was interpreted as aircraft material from Zone 105 (Black Deep; Figure 1). These included parts of a reconnaissance camera system, wiring, aircraft framing including a main spar, and a range of other items. Numbering on some of the aircraft components indicated that it was likely to be a Junkers (Ju) 88. Based on this

and the recovery of camera equipment, a tentative interpretation of a Ju 88D reconnaissance variant was made.

- 2.1.3 Following this report it was agreed with London Gateway that certain sections of the navigation channel impact area should be targeted by a programme of geophysical survey (zones 9-11, 26-36 and 105).
- 2.1.4 Interpretation of the results of the geophysical survey led to the identification of 543 target anomalies of potential archaeological interest (Wessex Archaeology 2012). Of these, 44 were identified as being newly identified and of archaeological potential, excluding those anomalies identified which have previously been the subject of Clearance Mitigation Statements. These were grouped and 18 areas of archaeological potential were selected for possible targeting by diver survey (Wessex Archaeology 2012a).
- 2.1.5 Amongst the targets, 7234 and 7235 in Zone 105 corresponded with the dredging track-plot and strike event (8024) that had recovered aircraft material in 2011 (Wessex Archaeology 2011 and Figure 1).
- 2.1.6 Rapid diver ground-truthing of a number of geophysical anomalies took place in February 2012. Lack of visibility and limited bottom time limited the data gathered at 7234 and 7235 but indicated the presence of aircraft material at both anomalies. This was confirmed by the subsequent recovery of a small number of finds from the site by PLA divers under archaeological watching brief. Both investigations suggested that there was high potential for buried aircraft wreckage.
- 2.1.7 The anomalies were approximately 25m apart. It was therefore thought that they might represent the crash site of a single Ju 88.

### **3 METHODOLOGY**

#### ***General***

- 3.1.1 The methodology of the watching brief is described in the *Aircraft Clearance Watching Brief* report (WA 2012, ref.72435.01) and is therefore not repeated here.
- 3.1.2 Clearance was undertaken in accordance with the *Written Scheme of Investigation for Recovery under Archaeological Supervision* (WA 2012b).
- 3.1.3 There is no standard methodology for the clearance by dredging of aircraft wreckage on the seabed in the UK. Nevertheless, in so far as was reasonably practicable, the clearance and post-clearance archaeological assessment were conducted in compliance with standard archaeological methodologies and national guidelines (IfA 2008: SMA 1993: SMA 1995).

#### ***Watching Brief***

- 3.1.4 The methodology of the watching brief is described in the *Aircraft Clearance Watching Brief* report (WA 2012, ref.72435.01) and is therefore not repeated here.
- 3.1.5 Clearance was undertaken by the 60m grab dredger *Cherry Sand* using a 3 cubic metre bucket. Finds were kept separate by bucket load.

- 3.1.6 The dredging software used continuously calculated the position of the bucket and was capable of recording point in time co-ordinates. It had therefore been hoped to obtain co-ordinates for the position of each bucket load and therefore for the finds found within. This would have assisted in identification and in assessing the condition of the aircraft wreck prior to the operation. However, this did not prove to be possible. As a result the only positional control achieved within the site are the written observations of where approximately the bucket was in relation to the site when large finds such as the aircraft engine were recovered.

#### ***Post-clearance Recording and Interpretation***

- 3.1.7 Post-clearance recording was carried out at WA Salisbury.
- 3.1.8 Finds transferred to a PLA warehouse following recovery, together with finds recovered during previous diving operations on the site, were then delivered to WA Salisbury.
- 3.1.9 A small number of finds that were considered on-site to be either particularly vulnerable or of potential significance in terms of site interpretation were transferred directly to WA Salisbury by the archaeologist who carried out the watching brief.
- 3.1.10 Following receipt at WA, finds were catalogued and photographed using standard archaeological recording procedures and forms. Three bags of finds were discovered to be contaminated by asbestos and were not recorded.
- 3.1.11 All finds have been quantified by type, and the data entered on to the project database (Access).
- 3.1.12 Airframe Assemblies Ltd. has expertise in the identification of historic aircraft parts. WA therefore commissioned them to examine the finds and to help in identifying the aircraft parts and the aircraft itself (Jones & Hodgkiss 2012). Their results have been incorporated into sections 4 and 5 below.
- 3.1.13 Copies of relevant contemporary records were obtained to help establish identity. In addition a number of secondary sources were also consulted. These are all listed in section 11 below.

## **4 FINDS**

### **4.1 Introduction**

- 4.1.1 A total of more than 300 finds have been recovered from the site. Of these the majority are associated with the wrecks of at least two aircraft. A number of other finds are unlikely to be associated with either wreck.

### **4.2 Cockpit/Instrumentation**

- 4.2.1 A total of 21 finds were identified as cockpit fittings or equipment (Appendix 1). These included:
- The badly damaged cockpit instrument console and electrical wiring (Plate 1).

- Individual instruments include a *pneumatischer Horizont* (artificial horizon) manufactured by Askania, Berlin and a *Führerterochterkompass* (leader's secondary compass), manufacturer unknown.
- Part of an *Anschluß für Heizbekleidung* (connector box for heated clothing), used by the *Luftwaffe* for high altitude flying (Plate 2).
- A GM-1 Boost control unit (Plate 3).
- A curved heavy sheet metal item measuring 88cm by 42cm and with a thickness of 1cm has been tentatively identified as armour plating protecting the back of the pilot's seat.
- Parts from a FuG 25 'Friend or Foe' (IFF) system designed to work with the German *Freya* or *Würzburg* ground to air radar systems.

### **4.3 Landing Gear/undercarriage**

- 4.3.1 Several finds were identified as being part of the main undercarriage or tail wheel (Appendix 1). These included a retracting tail wheel with a Michelin tyre marked 'AKL Continental Made in Germany 560 x 200; 5039496 4CP' (25/1468).

### **4.4 Engine and related parts**

- 4.4.1 In excess of ten finds were positively identified as being associated with aircraft engines (Appendix 1). These included:
- A BMW 801 14 cylinder radial engine (Plate 4). No supercharger or ancillary components appear to have been recovered.
  - Annular radiator for a BMW 801 engine. This has a stamped mark 'BMW Werk 4, 9.801.842-755.12'. BMW is the manufacturer, the number '9' indicates that it is engine related, 801 identifies the engine type and the last number is the part number. The radiator is also stencilled with the number '218'.
  - A cowling fragment stamped with the stamped number '9-801.824-894.12'.
  - Various oil cooler components.
  - Part of the engine bearers.
  - A three aluminium bladed Vereingite Deutsche Metallwerke (VDM) all metal propeller unit, fitted with reduction gears (Plate 5). One propeller blade is missing except for the stub and may have broken off. Another is bent irregularly backwards. The other appears to be approximately straight.
  - An unidentified three aluminium bladed propeller (Plate 6). All three propeller blades are present. Two are bent irregularly backwards.

### **4.5 Fuselage**

4.5.1 A large number of small pieces of aircraft fuselage were recovered. These ranged in size considerably from large section with piping, control, cables and even oxygen cylinders still attached, down to small fragments.

#### **4.6 Wings**

4.6.1 Numerous fragments of wing were recovered, ranging in size from the main spar/attachment to smaller fragments (Appendix 1).

4.6.2 The material is, like the other parts recovered, in crash damaged condition and shows evidence of having been damaged by the original dredge strike or grab. However, it is still possible to identify some of the material.

4.6.3 The most recognisable item is the main wing spar, which was one of the initial discoveries made during dredging. This is a major structural element that formed the attachment of the wing to the fuselage and was a weight bearing component, evident in the robustness of its construction.

#### **4.7 Oxygen System**

4.7.1 Parts of the oxygen delivery system were found. These included seven early war German oxygen cylinders, some still attached to their mountings on the fuselage wreckage and marked 'Luftwaffe' (Plate 9), oxygen pipes and an oxygen monitoring gauge.

4.7.2 The Ju 88 was designed to operate at high altitude, and the oxygen system was essential for the safety of the crew. The cylinders were located at the rear of the bomb bays, within the tail of the aircraft, with piping carrying the gas forward for use by the crew.

#### **4.8 Camera**

4.8.1 Parts of a camera system were found. These included the data plate from a German FK 30 photo-reconnaissance camera (Plate 7), utilising the Rb 50/30 lens system, ultra-large format film and bespoke camera apertures for the fuselage.

#### **4.9 First Aid Kit**

4.9.1 A complete first aid kit was recovered from the wreckage. It had been protected in an aluminium compartment that would have been integrated into the aircraft framing/fuselage. X-ray photography has revealed that it contained a range of medical equipment including morphine ampoules and syringes.

#### **4.10 Miscellaneous Items**

4.10.1 Two leather shoe soles were found within the recovered material. They appear to be children's shoes and are therefore highly unlikely to be associated with the aircraft wreckage.

4.10.2 A single timber was recovered. This item is not thought to be aircraft material and is probably the result of the loss of or damage to a vessel or coastal structure.

4.10.3 Clearly intrusive items to the site included coir matting and fenders, and a modern beer can.

## 5 DISCUSSION

### 5.1 Aircraft Type

- 5.1.1 Two different propellers were recovered. This means that the wreckage of two different aircraft was present within the site.
- 5.1.2 Gas cylinders recovered are stamped 'Luftwaffe'. This indicates that one of the aircraft is a German military aircraft.
- 5.1.3 A number of finds were stamped 'R8.88' (Plate 10), which identifies one of the aircraft as a German Junkers 88 (Ju 88) medium bomber. This is supported by the following additional evidence:
- A number of Ju 88 models were equipped with the BMW 801 14 cylinder radial engine.
  - The Ju 88 was fitted with VDM propellers with reduction gears (bombers required lower gear ratios than the fighters that also used the VDM propellers).
  - Rivet stamps on aircraft airframe components found during the dredge are consistent with number sequences known to have been used on the Ju 88 (WA 2011: 16).
- 5.1.4 The Ju 88 was a German twin-engined bomber used extensively by the *Luftwaffe* during the Second World War. In production from 1936 to 1945, more than 16,000 were built in dozens of variants. Designed in the 1930s as a '*Schnellbomber*' which would be too fast for fighters to intercept, advances in fighter performance meant that by the outbreak of war the key to the Ju 88's future success lay in its versatility. Operated as a bomber, dive bomber, heavy fighter, night fighter, reconnaissance aircraft, torpedo bomber and even as a flying bomb, the Ju 88 became a key asset of the *Luftwaffe*. The greatly increased performance of fighters also led to attempts to boost the performance of the Ju 88s engines.
- 5.1.5 The presence of a Ju 88 is not inconsistent with the location of the site. The seaward reaches of the Thames Estuary were regularly overflowed by *Luftwaffe* aircraft during the Second World War and a number of Ju 88s were lost there. No Ju 88s are known to have been lost outside of hostilities and therefore the aircraft must have been lost between 1939 and 1945.
- 5.1.6 Unfortunately, although a number of data plates were found for individual items of equipment, no manufacturer's data plate was found for the actual airframe. This meant that the individual aircraft could not be identified directly from its unique 'Werk-Number' (the number assigned to it upon construction). Nevertheless, it is possible to identify the individual aircraft from other evidence with a very high degree of confidence.
- 5.1.7 The GM-1 Boost control unit indicates that the aircraft was fitted with the *Göring Mischung-1* nitrous oxide boost system. This system, also known colloquially as the *Haha-Gerät* ('Ha-Ha Device'), enabled the fuel for the engines to be enriched with oxygen. This increased engine performance at high altitudes. Introduced by the *Luftwaffe* in 1940, it was an attempt to counter the increasing high altitude performance of British fighters. BMW 801

engines fitted with the GM-1 system were only used for the Ju 88 S series and the T version. The presence of the BMW engine and the boost system indicates that the German aircraft is one of these versions.

- 5.1.8 The presence of a heated clothing control unit suggests that the aircraft was intended for very cold flying conditions, which normally means high altitude. This component was introduced by the *Luftwaffe* in 1943, which indicates that the aircraft was not lost before 1943. This is consistent with the Ju 88, which was capable of high altitude use and with the in-service dates of the S and T versions.
- 5.1.9 In addition to probable camera ports and a single piece of undeveloped 30cm x 30cm ultra-large format negative film, a manufacturer's data plate marked "Carl Zeiss F.K 30" was recovered. This is from an Rb 50/30 camera system, used by the *Luftwaffe* for photo-reconnaissance.
- 5.1.10 The Ju 88S series were used in the Pathfinder role during Operation Steinblock, the 1944 'Baby Blitz' on London in 1944 and German bombers are known to have used the Thames during the war as an easily navigated route into London. However, the S series were not camera equipped.
- 5.1.11 The Ju 88T was developed as a long range reconnaissance aircraft. Intended as a series, only the T-1 version was put into small-scale production in 1944. One of the cameras that it is known to have been equipped with is the Rb 50/30.
- 5.1.12 The T version was also fitted with the 13mm MG131 machine gun as defensive armament. The expended 13mm German cartridge case amongst the finds is consistent with this. The T version was also fitted with the FuG 25 system.
- 5.1.13 The main photo-reconnaissance version of the Ju 88 was the D series, of which 1500 were built. However, these were equipped with the Jumo engine and did not have the GM-1 system. A single Ju 88b reconnaissance aircraft was equipped with the BMW 801 but not with the GM-1. Although the possibility of the unrecorded use of an S series in the photo-reconnaissance role cannot be entirely ruled out, it appears that the Ju 88 at 7234/5 is a Ju 88T.
- 5.1.14 The other aluminium bladed propeller has not been identified. However, it has the characteristics of a British propeller. As it is aluminium this suggests that it is an early war example as later blades of this size tended to be made of wood, which was lighter, cheaper and more easy to source. It is slightly smaller than the VDM propeller and could have been from a Lysander (Gareth Jones, pers. comm.), although this is unproven and somewhat speculative.
- 5.1.15 The Westland Lysander was a famous British army co-operation and liaison aircraft, in British service from 1938 to 1946. Single-engined, small and capable of landing and taking off from unprepared fields, it's most famous role was probably in ferrying Allied agents into and out of occupied France and Belgium.

- 5.1.16 A fragment of a Goodyear 'balloon' tyre and a Michelin inner tube made in England were recovered. This type of tyre was introduced in the 1930s. Unfortunately these had to be discarded before recording due to the presence of asbestos and it has not been possible to determine whether they are from a Lysander.
- 5.1.17 The master of the *Cherry Sand* was of the opinion that the VDM propellor and engine came from close to anomaly 7534, whereas the possible British propellor was recovered close to 7535. This might suggest that the anomalies represented separate aircraft wreck sites. However, none of the other finds have been identified as being from a Lysander as might be expected if more of the aircraft was present. The presence of this propellor is therefore somewhat anomalous.

## **5.2 Aircraft Identification**

- 5.2.1 The second aircraft, the possible Lysander, has not been identified. However, the Ju 88 has been and with a high degree of probability. This is because the only known T version loss in UK waters is that of Junkers Ju 88 T Works Number 0678 T9+FH.
- 5.2.2 This aircraft was a prototype for the T series and served with The *Versuchsverband Oberbefelshabers der Luftwaffe (Vd Ob. d. L.)*. This was a secretive *Luftwaffe* research and experimental aviation unit (Smith *et al.*, 2003).

## **5.3 The loss of Ju 88 T Works No. 0678 T9+FH**

- 5.3.1 The aircraft was shot down on 20th April 1943. Taking off from either Orly in France or Aarlborg, Denmark at 08:30, it refuelled at Schipol airfield at Amsterdam before heading west to begin a photographic reconnaissance mission in the Chelmsford area assessing recent air raid damage. The town was the home of the first purpose-built radio factory and had been bombed on 14th April.
- 5.3.2 The aircraft flew west and crossed the English coast between Harwich and the Blackwater Estuary. It then turned towards Chelmsford and switched its GM-1 system on, boosting its speed from 270 to 310 kph. It then switched its cameras on for the run in.
- 5.3.3 Warned by the wireless operator that a Spitfire was in the vicinity, the 31 year old pilot *Leutnant* (Ltn) Hans Joachim Baeumer (Bäumer) put on the emergency boost and went into a shallow dive to reach 360kph whilst turning towards Calais. However, the pilot's confidence in the ability of the aircraft to outrun the Spitfire was misplaced and it was attacked at 11:50. The port engine was hit, the boost system failed and the cockpit was reported as having filled with smoke. As the aircraft lost height the two rear crew bailed out at 26,000 feet, never to be seen again. After a second attack by the Spitfire, Bäumer bailed out at 4100 feet. He was picked up unconscious from the water by a Naval Air/Sea Rescue launch with slight burns. A rubber dinghy was found but nothing else. The K report states that the loss occurred five miles off Clacton, Essex (A.1 (K) Report No. 180/1943).
- 5.3.4 The pilot of the attacking Mk IX Supermarine was Norwegian fighter ace Lt Marius Eriksen. Following the invasion of Norway by Germany in April 1940,



Eriksen escaped from Nazi occupied Norway to Scotland in November 1940. Following training for the Norwegian Army Air Service in Canada he returned to Britain where he served with 331 (Norwegian) Sqn RAF, and later 332 (Norwegian) Sqn RAF based at North Weald near Epping in Essex. He achieved 9 aircraft kills.

- 5.3.5 The combat report filed by Eriksen recalls that he reacted to a 'scramble' and took to the air with 'Blue 2' in his Mk IX Spitfire (Combat Report 332 (Norwegian) Spitfire Squadron 30/7/1942). He climbed to 34,000 ft and then followed contrails until he recognised an aircraft as a Ju 88. He manoeuvred behind this aircraft and fired several bursts of machine gun fire into it before it 'went over on its back and exploded'. Following this Eriksen stated that 'smoke and flames came out and one of the crew baled out'. Most importantly Eriksen places the end of the engagement as '10 miles S. E. of Clacton (on Sea)', which is close to 7434/5.
- 5.3.6 As was usual, Bäumer was interrogated quickly. He and his crew were unusual, being both highly experienced and older than the norm. They appear to have been, in effect, test pilots. He claimed to have been flying a Ju 88 B, which suggests he was deliberately trying to mislead his captors into thinking that the mission was routine rather than an operational test flight of a new aircraft. This would of course have been of considerable interest to British Intelligence and probably explains what seems to have been a successful deception.
- 5.3.7 Baumer's fate after the war is presently unknown. Perhaps not that surprisingly for a high performance Norwegian fighter pilot, Eriksen became Norway's champion alpine skier in 1947-8. Possessed of good looks he became a sweater model before pursuing a successful film career in the 1950s. He passed away in 2009 after publishing his autobiography in 2002.

## **5.4 Site formation**

- 5.4.1 Whilst aircraft identification has proved to be relatively straightforward, site formation remains unclear.
- 5.4.2 The means of clearance and the possibility that very substantial damage to the site was done during the initial dredge strike makes it very difficult to determine what condition the Ju 88 wreck was in prior to the dredge strike. Given that the pilot bailed out at altitude and the aircraft was not therefore ditched, it is possible that the aircraft broke up as it hit the water and that the wreck was initially in a broken up or only partially intact condition. However, the existence of two discrete anomalies and the relatively limited area from which wreck material was recovered during clearance does suggest that it was not a dispersed wreck.
- 5.4.3 It has previously been observed that whilst one of the two surviving VDM propeller blades was bent backwards, the second was not and that this suggests that the engine was stopped (WA 2012). Given that the pilot bailed out rather than ditch, this suggests that battle damage was the cause of the engine failure. It also suggests that the aircraft hit the water at a shallow angle, although it is also possible that it was bent during a subsequent impact such as the dredge strike.

- 5.4.4 The presence of marine growth on the bent blade indicates that that part of the propeller was not buried at the time of recovery. It has previously been suggested that this indicate that the aircraft was on its back, but it may be co-incident.
- 5.4.5 Although a very large number of finds were recovered, most are small and a large part of the aircraft, including one of the engines was not recovered. However, uncertainty with regard to the completeness of recovery and with regard to the scale of impact of the dredge strike means that it is not possible to assess what percentage of the wreck survived until the dredge. Nevertheless it is notable that most parts of the aircraft, except perhaps one wing, are represented amongst the finds.
- 5.4.6 Most of the finds were not covered in marine growth and many showed no signs of corrosion. This suggests that the surviving wreck material may have been entirely buried prior to the dredge strike, with the exception of the VDM propeller and perhaps the oxygen cylinders.
- 5.4.7 A number of finds that were recovered clearly have nothing to do with the aircraft wreckage. It is not unusual for wreck sites to become contaminated with intrusive material. It is likely that this material has been moving in the strong currents of the area before becoming trapped amongst the wreckage of the aircraft.
- 5.4.8 The presence of a British 20mm cannon round manufactured in 1952 is clearly co-incident.
- 5.4.9 There is too little information about the second aircraft to reach any conclusion. As noted above the fact that the dredger master observed the relevant propeller to come from near 7535 suggests that there may have been two distinct wreck sites. This is problematic because, on a balance of probability basis, two aircraft are extremely unlikely to crash separately within 25m of each other, even in such a fought-over location as the Thames Estuary.
- 5.4.10 One possible solution is that 7534 and 7535 are not the original crash sites of one or both of these aircraft. Commercial fishing vessels are anecdotally reported to sometimes move wreck material caught in nets to a single dumping point which can then be more easily avoided. Whilst there is no actual evidence that this has occurred, the possibility cannot be ruled out. Informal correspondence with the PLA suggests that obstructions cleared for the purpose of ensuring safe navigation post-war are likely to have been recovered rather than simply moved.

## **6 STATEMENT OF POTENTIAL**

### **6.1 Archaeological potential**

- 6.1.1 It is rare but not entirely unusual to find aircraft remains in sub-tidal situations in the territorial waters of the United Kingdom, especially in the south-east of England. The aircraft material discovered on the Site is in the condition expected of an aircraft that was shot down and is reported to have exploded prior to crashing into the sea - *i.e.* fragmentary.

6.1.2 Some coherent structure exists, with surprising levels of preservation given the deposition and post-deposition processes that have impacted the site. The archaeological potential of many of the individual components of the aircraft do not relate to their condition, but more to their rarity which is discussed further below. The archaeological importance of the aircraft is considered: **Medium/High**.

## 6.2 Historical potential (campaign)

6.2.1 The aircraft is not known to have been involved with any particular campaign. It was undertaking fairly routine operational testing, photographing bomb damage caused by recent raids over Chelmsford, Essex. The town had experienced a heavy bombing raid by 20 *Luftwaffe* aircraft on the night of 14th April 1943 ([www.chelmsfordwarmemorial.co.uk](http://www.chelmsfordwarmemorial.co.uk)). One of the main targets of the *Luftwaffe* raids would have been Marconi's New Street radio factory, the world's first purpose build radio factory, employing 6,000 people during WWII and which was a major producer of military radio equipment for the war effort.

6.2.2 One clue as to why Eriksen has been able to gain altitude and be in a position to intercept T9+FH comes from an account by Horst Götz, a highly decorated *Versuchsverband* reconnaissance pilot, writing in early 1944:

6.2.3 *'Regular reconnaissance aircraft had little success over England at this time. The defences were too strong. It fell to the Rowehl outfit [1./Nd Ob. d. L.] to fly unusual aircraft on reconnaissance missions over England. We tried to fly over England but always had to turn back because of strong fighter defences. As we approached our "colleagues" were waiting for us at higher altitude. I finally realized why this was happening. The French resistance radioed every one of our take-offs to England since it was customary to announce every flight with time and point of take-off. From then on, we announced only "maintenance" flights and we got through. We even used the vapour trails of outgoing bomber formations as cover'* (Smith *et al.* 2003: 36).

6.2.4 Although it cannot be proven, it would appear that Eriksen had been told by RAF command where to patrol and at what altitude based on information provided by the Resistance (French or otherwise) and this may have been why Eriksen was able to wait at altitude for T9+FH and successfully engage it. It was not until later in 1943 or Early 1944 that Götz was able to see a way around the resistance problem - too late for Bäumer, and this gives a tentative link to the resistance campaign on the European mainland in the narrative of this particular aircraft. Götz was later promoted to *Staffelführer* (Squadron Leader) of 1. *Staffel* of the *Versuchsverband*. The historical importance of the Campaign is considered: **High**.

## 6.3 Historical potential (People)

6.3.1 The historical potential of the aircraft due to the unit, pilot and the pilot of the spitfire that shot T9+FH down, is considerable. Each was important in relation to WWII history, the *Luftwaffe*, the RAF and the Norwegian Army Air Service.

6.3.2 Hans Bäumer is believed to have been a test pilot for Junkers (Ramsey and Wakefield 1990: 247) and he was possibly a test pilot for Lufthansa (Smith *et al.* 2003: 30) and was a member of the secretive *Versuchsverband Ob d. L.*, which later became KG200, the most secretive *Luftwaffe* unit (*ibid.*).

- 6.3.3 Little is known about Bäumer beyond this. He is known to have been decorated for his work, holding the *Eisernes Kreuz* (Iron Cross) 1st Class, and the bronze (20) war flights clasp; probably the reconnaissance clasp with an eagles head, although this is not specified in the K report (RAF 1943b). This all points to Bäumer being an experienced and valued pilot. The historical importance of Hans Bäumer is considered: **High**.
- 6.3.4 Marius Eriksen, then 21, was one of Norway's fighter aces, and a historical figure in his own right. His father was a gymnast and Olympic Bronze medallist at the 1912 Olympics. Marius was the older brother of Stein Eriksen, Olympic Gold medallist in Skiing in 1952. Their mother, Birgit, started the Norwegian Ladies Ski Club in 1933.
- 6.3.5 After the *Wehrmacht* invaded Norway in summer 1940, Eriksen escaped from Norway via Ålesund to Scotland. He then underwent flying training at the Norwegian Army Air Service flight training school in Toronto, Canada. He then returned to Britain joining first 331 (Norwegian) Squadron and then 332 (Norwegian) Squadron RAF, based at North Weald in Essex.
- 6.3.6 He achieved nine confirmed kills during his RAF career making him one of Norway's top fighter pilots. But less than two weeks after shooting down T9+FH in his Spitfire Mk IX, he was himself shot down over France and captured. He had attempted a head on attack on a Focke-wulf (Fw) 190, and neither he, nor his opponent had backed down, resulting in his crash. He baled out of his burning aircraft, whilst *Hauptman* Wickop, his German opponent, was able to make a forced landing (<http://www.rafandluftwaffe.info/lists/raf1.htm>). Eriksen was then captured and imprisoned in the infamous *Stalag Luft III* in Poland until his release in 1945. The loss of the Norwegian top fighter pilot at the time was a significant blow to the Norwegian Squadrons.
- 6.3.7 During his wartime flying career he was awarded the Distinguished Flying Cross, as well as other Norwegian and International decorations.
- 6.3.8 After the war he had a colourful career, becoming the Norwegian champion for slalom skiing in 1947 and 1948, a sweater model - his mother Birgit having designed the most widely used knitwear pattern in Norway, and later a film actor (obituary: <http://www.abcnyheter.no/sport/090715/mannen-i-mariusgensen-er-dod>). Marius Eriksen died in Norway on 6 July 2009. The importance of Eriksen as a historical figure, especially in Norway is considered: **High/Very High**.
- 6.4 Historical potential (Units)**
- 6.4.1 *1./Versuchsverband Ob. d. L.* was one of the key secret units of the *Luftwaffe* operating photographic reconnaissance, as well as a range of other clandestine operations. They operated a range of specialist long-range reconnaissance and transport aircraft for the *Luftwaffe*, and the later became *2 Gp KG 200*, part of the most secretive of the *Luftwaffe's* clandestine units. The importance of the association with this historical unit is considered: **High/Very High**.
- 6.5 Historical potential (variant)**

- 6.5.1 The evidence so far indicates that this aircraft is entirely unique. As a prototype on operational testing, it was undergoing live testing to ensure it met the requirements of the *Luftwaffe* specification. Despite its loss, the T series was built in small numbers and saw service in the Mediterranean and Black Sea theatres of operations.
- 6.5.2 Certain items within the assemblage have already been identified as unique, and some items may be the only known examples. These include the GM-1 control unit and the fuselage apertures for the cameras, which are of a type previously unknown (Jones and Hodgkiss 2012). The importance of the aircraft variant is considered: **Very High**.

## **7 PROPOSALS FOR ANALYSIS, PUBLICATION AND ARCHIVE**

### **7.1 Introduction**

- 7.1.1 Further analysis will be conducted on finds and documentary material. The results of these analyses will be correlated with the structural data recovered during the excavation and will form the basis of report text.
- 7.1.2 The following publications have been agreed with the client:
- An academic report in the *International Journal of Nautical Archaeology*
  - An article in *Current Archaeology*
  - A popular booklet.
- 7.1.3 The academic report will comprise an integrated interpretation and discussion of the findings commensurate with the significance of the data recovered; this will include a discussion of the wider context of the findings.

### **7.2 Aims and Objectives**

- 7.2.1 The aims for the analysis and publication phase are as follows;
- To ensure the long-term curation of the data recovered and its dissemination in a form appropriate to its significance and academic value.
  - To carry out an agreed programme of post-excavation analysis and reporting following the procedures set out in MoRPHE (English Heritage 2006).
  - To produce report text for publication in the three publication formats set out above.
- 7.2.2 The tasks required to complete the academic report and popular dissemination are detailed in Table 2 below. The *Current Archaeology* article and popular booklet will be written once work for the academic report has been completed.
- 7.2.3 The academic report will contain a description of the materials and functions of finds represented in the assemblage. Further detailed proposals for each class of material are listed below. The affinities of the assemblage will be

discussed, with any implications for the understanding of the Site. A limited discussion of the intra-site distribution will also be included. A small selection of key finds will be illustrated as a representative sample, focusing on the *Luftwaffe* aviation in WW2.

## 8 PROVISIONAL TASK LIST, AND RESOURCES

### 8.1 Task List and Resources

8.1.1 **Table 2** below presents the list of tasks and resources required to produce reports for publication in the three formats set out above. Proposed personnel and their qualifications are listed at 8.3.1:

**Table 2: Task list and resources**

Task	Grade	Days/cost
<b>ANALYSIS TASKS</b>		
<i> Finds</i>		
Fuselage/Airframe	Ext	2
Camera Equipment	Ext	2
Instruments	Ext	2
Engine	Ext	1
Landing gear	Ext	1
Other components	Ext	1
<i>Records analyses</i>		
Primary Records	SPO	2
Secondary Sources	SPO	2
Overview and Summary	SPO	1

<b>REPORTING TASKS</b>		
Introduction and Methods	SPO	1
Archaeological background	SPO	1
Site descriptions	SPO	2
Discussion and synthesis, acknowledgements and bibliography	SPO	5
Preparation of publication illustrations	SPO	1
Editing of finds reports	FM	0.5
Editing of environmental reports	EM	0.5
Site illustrations	Drawing Office	3
Finds illustration	Drawing office	1
Editing/reading and amendments	PM	2
	EM	1
	FM	1
	Reports Manager	1
<b>Other tasks</b>		
Management	Project Manager	10
Archive preparation	PO	0.5
Finalise finds box lists and index	PS	0.5
Carry out & document discard policy	PS	2.5
Microfilm job sheets & checking	PO	0.5
Microfilm paper records	Marathon	TBA
Archive deposition	PO	2
Box storage grant		

8.1.2 English Heritage will be consulted on arrangements for peer review/refereeing of the academic publication.

## **8.2 Programme**

8.2.1 The publication programme will be pursued during FY 2013-14.

## **8.3 Personnel**

8.3.1 It is currently proposed that the following Wessex Archaeology core staff will be involved in the programme of post-excavation analyses.

Project Manager/Co-author	Toby Gane MPhil MIfA
Finds Manager	Lorraine Mephram, BA, MIfA
Senior Project Officer/Co-author	Graham Scott, BA, AlfA
Senior Project Officer/Pottery/Other finds	Lorraine Mephram, BA, MIfA
Specialist Aircraft Finds	Gareth Jones/Philippa Hodgkiss

## **8.4 Wessex Archaeology Quality Standards**

8.4.1 Wessex Archaeology operates an integrated project management system. Projects are assigned to individual Project Managers who monitor their progress and quality and control budgets from inception to completion, in all aspects including Health and Safety. Projects are managed in accordance with English Heritage guidelines outlined in the document MoRPHE Project Manager Guide (English Heritage 2006).

## **9 STORAGE AND CURATION**

### **9.1 Museum**

9.1.1 It is recommended that the project archive resulting from the excavation be deposited with Southend Museum Service Store. Deposition at the store on completion of the project has been agreed in principle with Southend District Council, under the Accession Code (**TBC**). Deposition of the finds with the Museum will only be carried out with the full agreement of the statutory authority (Essex County Council).

### **9.2 Preparation of Archive**

9.2.1 The complete Site archive, which will include paper records, photographic records, graphics, and artefacts, will be prepared following the guidelines for the deposition of archaeological archives in the Southend Museum Service Store, and in general following nationally recommended guidelines (Walker 1990; SMA 1995; Richards and Robinson 2000; Brown 2007).

9.2.2 All archive elements are marked with the Site code and accession code, and a full index has been prepared. The archive comprises the following:

- 20 cardboard boxes or airtight plastic boxes of artefacts & ecofacts ordered by material type
- 5 files/document cases of paper records & A3/A4 graphics
- 10 files photographs
- 2 A1 graphics

### **9.3 Conservation**

9.3.1 No immediate conservation requirements were noted in the field. Finds which have been identified as of unstable condition and therefore potentially in need of further conservation treatment comprise the metal objects, particularly un-anodised aluminium which has reacted adversely with the seawater.

9.3.2 Some metal objects have been X-radiographed as part of the assessment phase (including the first aid kit), as a basic record and also to aid identification. On the basis of the X-rays, the range of objects present and their provenance on the Site, no objects have yet been selected for further conservation treatment. Recommendations are made for the discard of some material types (see below). An assessment of conservation requirements will be undertaken.

#### **9.4 Discard Policy**

9.4.1 Wessex Archaeology follows the guidelines set out in Selection, Retention and Dispersal (Society of Museum Archaeologists 1993), which allows for the discard of selected artefact and ecofact categories which are not considered to warrant any future analysis. Any further discard is likely to be relatively minimal, but the following categories are proposed for discard:

- *Intrusive material (Wood)*: post-medieval only; total discard
- *Intrusive material (Organic)*: modern, undiagnostic; total discard
- *metalwork*: undated objects; undiagnostic, unstable for long-term curation; total discard

9.4.2 The discard of environmental remains and samples follows the guidelines laid out in Wessex Archaeology's 'Archive and Dispersal Policy for Environmental Remains and Samples'. The archive policy conforms to nationally recommended guidelines (SMA 1993; 1995; English Heritage 2002) and is available upon request.

9.4.3 The discard policy for both finds and environmental material will be fully documented in the project archive.

#### **9.5 Copyright**

9.5.1 The full copyright of the written/illustrative archive relating to the Site will be retained by Wessex Archaeology Ltd under the Copyright, Designs and Patents Act 1988 with all rights reserved. The recipient museum, however, will be granted an exclusive licence for the use of the archive for educational purposes, including academic research, providing that such use shall be non-profitmaking, and conforms to the Copyright and Related Rights regulations 2003.

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#### **9.6 Published and grey literature sources**

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Wessex Archaeology, 2012b, London Gateway Port: Written Scheme of Investigation, Unpublished report ref. 72435.01

Wessex Archaeology, 2012c, London Gateway Port: Aircraft Clearance Watching Brief, Unpublished report ref. 79800.02

Williams, J. and Brown, N. (eds.), 1999, *An Archaeological Research Framework for the Greater Thames Estuary*, Essex: Essex County Council

## **9.7 Contemporary documents**

RAF, 1943a, Individual Combat Report 23/23/43, 20-4-43

RAF, 1943b, K (intelligence) Report 172/1943

The Late Peter Foote Archive (Offshore Incidents) 20 Vols. 1939-45

## APPENDIX 1: FINDS LIST

Object Number	Photograph Number	Description
<b>Engines</b>		
13/1534	15, 16	Engine part
37	42, 43	Heavy curved iron plate - part of engine molding/armour plating
248/1273	273, 274	Engine part
249/1450	275, 276	Propeller (2nd prop 38)
250/1280	276, 277, 278	Propeller
256	285, 286	Radiator fragment with markings: <b>BMW.Werk 4 9.801.842-755 12</b>
270/1274	300, 301, 302	Engine part
271/1530	303, 304	Misc. engine parts (x7)
277	310	Propeller nose cone
315	353	engine part
<b>Undercarriage</b>		
3/1467	3	Possible external undercarriage component
14/1466	17	Possible shock absorber/piston(?) with attached adjustable leather strap
25/1468	29, 30	Rear wheel with serial number/maker markings; <b>AKL Continental Made in Germany</b> (written in English, French, and German) <b>560 x 200; 5039496 4CP</b>
48/1527	60	Iron fragment possibly associated with rear landing gear assembly
87/1479	99, 100	Inner wheel or brake disc for landing gear
88/1472	101	Landing gear shock absorber cover
209	230, 231	Possible landing gear assemblage
289	326	Piston/shock absorber for the landing gear
<b>Cockpit</b>		
40/1509	49, 50	Cockpit instrument display/console fragment
41	51	Cockpit instrument display panel fragment
42	52	Misc. possible cockpit display instruments, panels, wiring (x9)
43	53	Mass of intertwined cockpit and instrument panel wiring
49	61	Group number for Misc. items probably associated with cockpit instruments (x30+)
50	62	Possible cockpit fragment - Serial lettering; <b>D aim</b>
51	63	Possible cockpit fragment - Serial number/lettering; <b>m. LDS 2/4</b>
60	72	Possible cockpit fragment
83/1474	96	Possible cockpit fragment with handle and wiring
111	126	Window/cockpit object?
114	129	2x glass sherds (Possibly from the cockpit?)
133	148	Airframe fragment - Anschluß für Heizbekleidung (connector box for heated clothing),
150	165, 166, 167, 168	Armour plating for possibly pilot's seat - Serial numbers; top front side - <b>88 152-4106</b> , mid rear

Object Number	Photograph Number	Description
		side - <b>5</b> and underneath <b>18 E</b>
283	316	Misc. plastic (?) covering
295	333	dial frag with partial image of aeroplane
298	336	cock pit frag - hand written on front (next to various lights and switches); <b>Not</b> ; (in an inverted triangle) <b>GM1; klar</b> ; (several drawn arrows pointing at) <b>Aus; Ein; Ent. Lüft.</b> ; (arrow pointing at) <b>Ein</b>
299	337	cock pit frag - printed around top of side; <b>Bauart u. Hersteller Friesekeu. Höpfner RSSFS; Sach Nr 124-99702 Wo...Nr..75378 Ln 28669</b>
300	338	cock pit frag - numbers; <b>FI 32619 2; B.M.77.stp.21C</b>
301	339	cock pit frag, compass
303	341	cock pit frag, dial - hand written number inside dial <b>42/62</b> ; hand written on board <b>Nr.40534-4</b> (then another partial digit); number on internal component <b>3083AK/13</b>
317	355	dial - lettering around edge; <b>W1247038; F122410</b>
<b>Wings/Tail</b>		
20/1463	23, 24	Possible wing/tail fragment with steering mechanisms(?) with attached wires. Markings on adjustable arms; <b>Pue R8-83.400-48046, SSSI ® 31154, R8-88, 1 VLW</b>
39/1483	45, 46, 47, 48	Tail section fragment with possible rear landing wheel mount
104	119	Wing/tail control flap
153	171	Wing/tail fragment
189	209	Wing/tail fragment
269/1263	299	Fragment of airframe (wing)
286	323	.
<b>Fuselage</b>		
5/1539	5	Fuselage fragment
6/1538	6	Fuselage fragment
7/1464	7	Fuselage fragment with x5 attached pipes
8/1540	8	Fuselage fragment with bolt
9	9, 10	Fuselage fragment with x7 attached pipes. Plastic bracket with Serial number <b>8-8899-23141</b>
11/1536	13	Rusted fuselage fragment
12/1529	14	Rusted fuselage fragment
15	18	Riveted fuselage fragment
16/1537	19	Fuselage fragment
17	20	Fuselage fragment
18	21	Riveted fuselage fragment
19/1531	22	Rusted fuselage fragment
21/1465	25	Riveted fuselage fragment
22	26	Fuselage/wing fragment
23/1462	27	Fuselage fragment with paint elements

Object Number	Photograph Number	Description
26/1481	31	Airframe/fuselage fragment with x3 attached pipes and riveting
27	32	Fuselage fragment
28/1480	33	Rusted fuselage fragment
29/1477	34	Fuselage/wing skeleton fragment. <b>No:19</b> on surface
30/1520	35	Fuselage fragment with circular hatch built in
31	36	Airframe fragment from fuselage or wing
32	37	Riveted fuselage fragment
34	39	Fuselage fragment
36	41	Fuselage fragment with dark green paint elements
44/1496	54	Riveted fuselage fragment
45	55	Riveted fuselage fragment with attached adjustable leather straps and possibly part of the oxygen storage compartment
46	56, 57	Fuselage fragment with lining (possible floor or ceiling) airframe
47	58,59	Fuselage fragment with evidence of paintwork
52	64	Fuselage fragment
53	65	Fuselage fragment
54	66	Fuselage fragment
55	67	Fuselage fragment
56	68	Fuselage fragment
57	69	Fuselage fragment
58	70	Fuselage fragment
59	71	Fuselage fragment
61	73	Fuselage fragment
62	74	Fuselage fragment
64	77	Fuselage fragment
65/1521	78	Fuselage fragment
66	79	Fuselage fragment
67	80	Fuselage fragment
68	81	Fuselage fragment
78	91	Fuselage fragment
79/1607(?)	92	Fuselage fragment with fragments of the airframe
80/1471	93	Fuselage fragment with attached pipes
81/1541	94	Fuselage fragment
82/1512	95	Fuselage fragment
84/1510	97	Fuselage panel fragment
85	98	Fuselage fragment with attached control pipes
89	102	Misc. fuselage fragments (x9)
96	110	Fuselage fragment with iron cable
97	111	Misc. fuselage fragments (x8)
105	120	Fuselage fragment with cylinder mount
109	124	Fuselage fragment
113	128	Fuselage fragment
115	130	Misc. fuselage fragments (x9)
123	138	Misc. fuselage fragments (x9)

Object Number	Photograph Number	Description
135	150	Misc. fuselage fragments (x16)
140	155	Misc. fuselage fragments (x7)
144	159	Fuselage fragment
145/1619?	160	Fuselage fragment
146	161	Fuselage fragment
147	162	Fuselage fragment
148	163	Fuselage fragment
149	164	Fuselage fragment with pipe fabric remains
151	169	Fuselage fragment with attached iron pipe/cord?
152	170	Fuselage fragment
155/1464	173	Fuselage fragment
156/1425	174	Fuselage fragment
158	176	Airframe fragment
161/1541	179	Fuselage fragment
162/1457	180	Fuselage fragment
163/1465	181	Fuselage fragment
164/1463	182	Fuselage fragment
165	183	Misc. fuselage fragments (x6)
169	187	Misc. fuselage fragments (x8)
176	194	Fuselage fragment
177	195	Fuselage fragment
178	196	Fuselage fragment
179	197	Fuselage fragment
180	198, 199	Fuselage fragment with Serial Marking; <b>R8 - 88.503 - 760; 2318</b> , a makers mark, and then four unknown digits
181/1514	200	Fuselage fragment
182	201	Fuselage fragment
183	202	Fuselage fragment
184	203	Fuselage fragment
185	204, 205	Fuselage fragment with Serial Number; <b>8 - 88.503 - 6120</b>
186	206	Fuselage fragment with 'Duck Egg' blue paint evidence
187	207	Fuselage fragment
188	208	Misc. fuselage fragments (x29)
191	212	Fuselage fragment with circular holes and holding straps
193	214	Angled fuselage fragment (?) with attached leather
197	218	Strut with fuselage fragments attached
198	219	Fuselage fragment
199	220	Fuselage fragment
200	221	Fuselage fragment
201	222	Fuselage fragment
202	223	Fuselage fragment
203	224	Fuselage fragment
204	225	Fuselage fragment
205	226	Fuselage fragment
206	227	Fuselage fragment

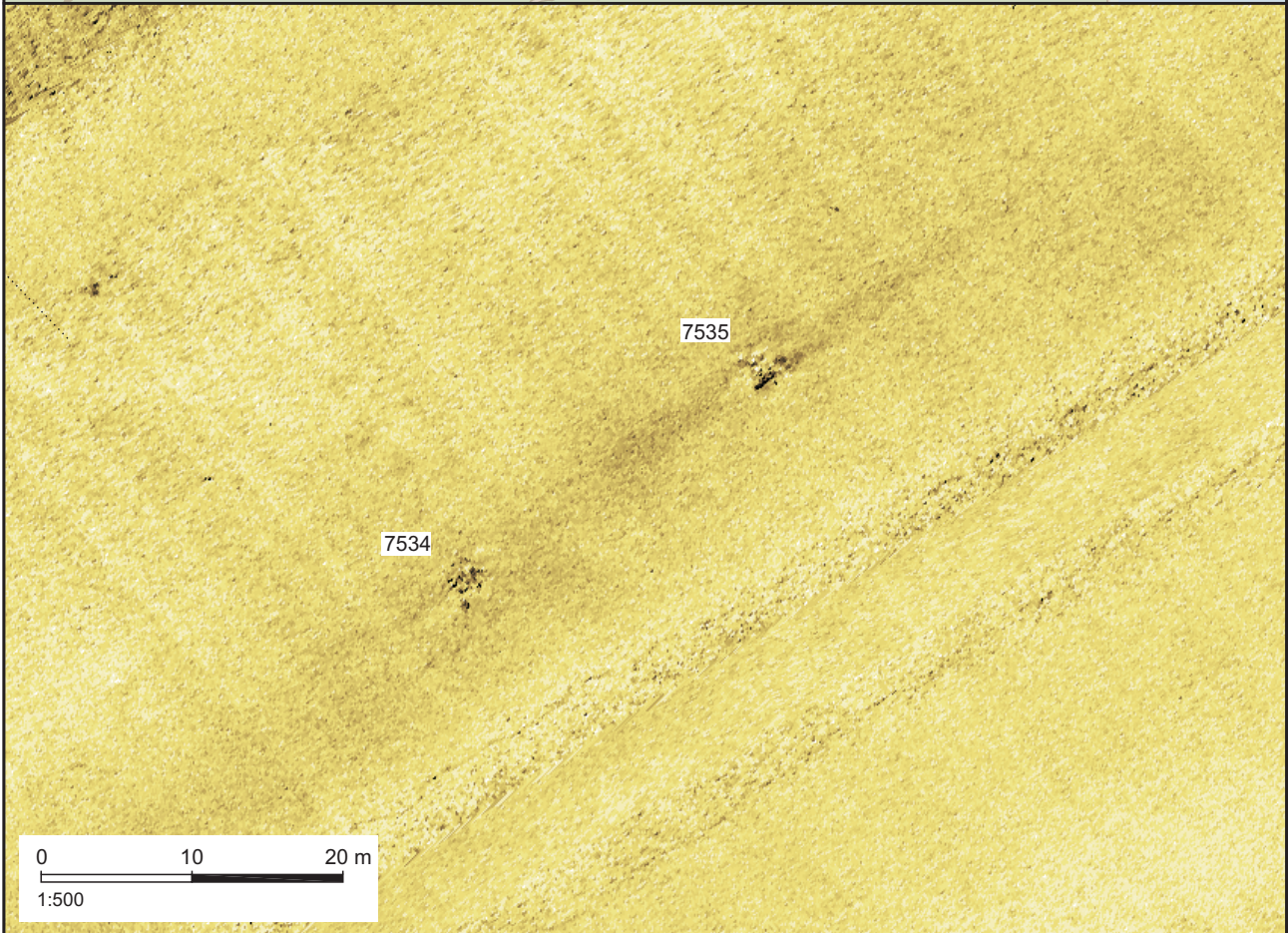
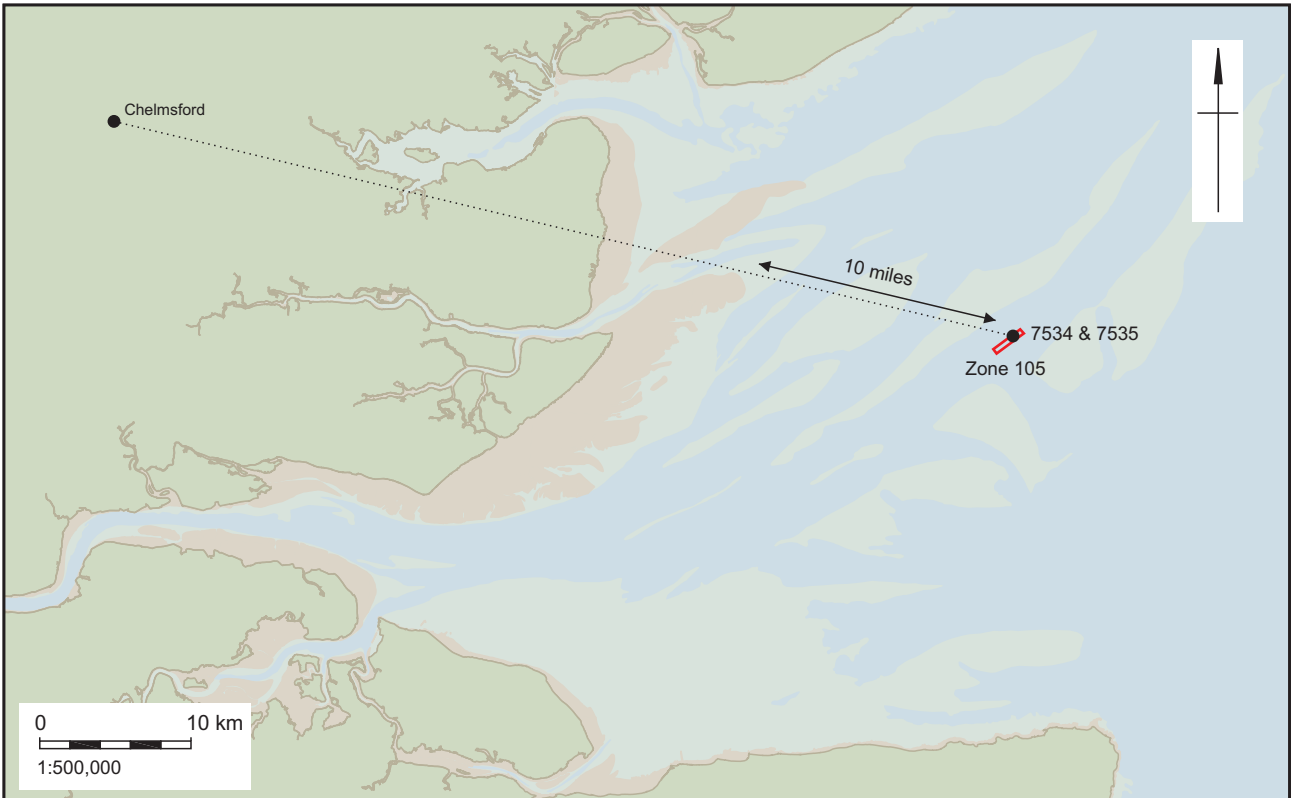
Object Number	Photograph Number	Description
207	228	Fuselage fragment
208	229	Curved metal frame with possible latch/handle
210	232	Misc. fuselage fragments (x34)
214	236	Fuselage fragment
215	237	Fuselage fragment
223	246	Large airframe/fuselage fragment
224	247	Fuselage fragment
225	248	Misc. fuselage fragments (x15)
234/1356	257	Fuselage fragment
235/1351	258	Fuselage fragment
236/1359	259	Fuselage fragment
237/1354	260	Fuselage fragment
238/1352	261	Fuselage fragment with iron bolt attached
239/1355	262	Fuselage fragment
244/1343	267	Fuselage fragment (Asbestos was found but has been removed)
245	268	Fuselage fragment
246/1454	269	Fuselage fragment with evidence of paint (Dark yellow)
247	270, 271	Airframe fragment with Serial Number; <b>Stab-F.uG.25 Ein</b>
251/1522	280	Fuselage fragment with rubber gun port attached
253/1491	282	Airframe fragment
254/1517	283	Fuselage fragment with x2 blue oxygen cylinders attached
255	284	Fuselage fragment
257/1475	287	Fuselage fragment with attached wiring
259/1288	289	Fuselage fragment
261/1278	291	Fuselage fragment
263/1282	293	Fuselage fragment
265/1291	295	Fuselage fragment
268	298	Airframe fragment
275	308	Misc. fuselage fragments (x17)
282	315	Misc. fuselage fragment
284	317, 318	Fuselage component for first aid kit
287	324	Airframe fragment
288	325	Airframe fragment
290	327	Airframe fragment with iron object
291	328, 329	Airframe fragment with iron object and part of the fuselage attached
293/1547	331	Fuselage fragment with evidence of material traces. Marking <b>V/109</b>
294/1546	332	Fuselage fragment with paint ('Duck Egg' and others) and material traces. Serial Number; <b>88.123-270 02</b>
<b>Objects associated with crew</b>		
1/1494	1	x4 oxygen cylinders (x3 blue, x1 grey) joined together with Luftwaffe label and serial numbers on the base. Volume 2.03 litres
2	2	Blue oxygen cylinder with number on base and



Object Number	Photograph Number	Description
		neck
103	118	Oxygen (?) cylinder with Luftwaffe markings and numbers
221	244	Silk parachute fragment with camouflage pattern
285	319, 320, 321, 322	Intact first aid kit
306	344	leather strap
314	352	O2 cylinder
<b>Misc. Objects</b>		
4	4	Vent/grill
10	11, 12	Wire (blue) attached to unknown object at one end - possibly associated with cylinders. <b>101F</b> on wire cover
24	28	Misc. items (x16)
33	38	Misc. items (x20+)
35	40	Misc. items (x10)
38	44	Misc. items (x14)
63	75, 76	Hard black plastic cover plate (electrical?)
69	82	Fragment of pipe possibly associated with cylinders
70	83	Leather type material attached to a support beam
71	84	Hose with writing on; <b>3R</b> at one end and <b>NW4 Arms</b> at the other
72	85	Leather type object
73	86	Rubber or plastic hose with <b>30H1</b> marking
74	87	Metalic card holder?
75	88	Cylinder holding straps
76	89	Iron object
77	90	Misc. items (x40)
86	106	Wire with possible attachment
90	103	Misc. wiring
91	104	Misc. tubing (x5)
92	107	Plastic adjustable arm
93	105	Misc. cable
94	108	Electrical component
95	109	Misc. electrical components
98	112	Iron cable
99	113	Pipe with attachments
100	114	Electrical wiring
101	115, 116	Toothed machine cog
102	117	Modern beer can
106	121	Misc. aluminium fragments (x15)
107	122	Misc. electrical wire
108	123	Bakelite wheel
110	125	Brush fragment
112	127	Bolt with attached circular plate
116	131	Encased electrical wiring
117	132	Electrical component



<b>Object Number</b>	<b>Photograph Number</b>	<b>Description</b>
118	133	Misc. pipes (x2)
119	134	Angled wooden block
120	135	Misc. electrical components (x2)
121	136	Misc. iron objects (x2)
122	137	Misc. wiring
124	139	Spring
125	140	Leather fragment
126	141	Aluminium panel
127	142	Misc. object
128	143	Misc. corroded iron objects (x5)
129	144	Iron pipe
130	145	Misc. object
131	146	Misc. pipe and cables (x5)
132	147	Hawser? With attached airframe?
134	149	Misc. wires
136	151	Leather fragment
137	152	Misc. assorted objects (x3)
138	153	Misc. pipes (x3)
139	154	Misc. wires
141	156	Rubber seal
142	157	Misc. fragment including levers
143	158	Sawn fragment of wood
154/1461	172	Pipe fragment
157/1460	175	Electrical wire
159/1456	177	Pipe fragment
160/1459	178	Pipe fragment
166/1462	184	Pipe fragment
167/1451	185	Old rug?
168	186	Misc. electrical wire
170	188	Misc. pipes (x4)
171	189	Adjustable arm fragment
172	190	Bakelite electrical component?
173	191	Misc. objects (x3; x2 leather, x1 metal)
174	192	x2 Hawser cables with attached metal mounts
175	193	Misc. electrical wires with attachment
190	210	Iron fragment
192	213	Iron switch/lever
194	215	Pipe fragment
195	216	Misc. pipes (x6)
196	217	Electrical components (x2)
211	233	Electrical component - metal coil
212	234	Iron lever arm
213	235	Complete circular cover plate
216	238, 239	Iron object with cog wheel on one side
217	240	Iron plate
218	241	Aluminium disc mount
219	242	Misc. electrical components (x2)
220	243	Misc. pipes (x5)
222	245	Electrical component
226	249	Misc. diagnostic iron components (x6)

Object Number	Photograph Number	Description
227	250	Misc. hose and pipes (x4)
228/1348	251	Fragment of toothed cog (possibly associated with the propellers)
229/1347	256	Iron toothed ring mount
230/1353	252	Iron cable with possible terminus
231/1357	253	Iron cable with possible terminus
232/1346	254	Leather circular strap/mount
233/1350	255	Iron strap fragment
240	263	Iron bolt
241/1358	264	Jubilee/steel clip
242/1349	265	Aluminium ring
243	266	Possible pedal fitment/instrument
252	281	Rubber gun port
258	288	Misc.cable
260/1283	290	Hose fragment
262/1285	292	Misc. bolt/screw
264/1286	294	Misc. lever?
266/1279	296	Bakelite electrical component?
267/1287	297	Misc. electrical component
272	305	Misc. pipe
273	306	Misc. rubber seals/washers (x7)
274	307	Misc. electrical wiring (x2)
276	309	Threaded cog/ring
278	311	Lever fragment
279	312	Misc. aluminium component
280	313	Misc. hose with attachments and material cover fragments
281	314	Misc. rubber pipes (x3)
296	334	Tag/label with writing (first part missing) - <b>eisung für Flügel „Auf"</b>
297	335	Film
302	340	label/tag - <b>Kabelabgleich K Ag K 6; Bauart bou; Gerät Nr. 124-259 A-1; WerkNr. 40534-41; Anforderz Ln 26937; Herstelle bou</b>
307	345	circuit board
308	346	pipe work, bakelite gragment attached with symbol and numbers - <b>10539; ....kmesser ....ss 18b; 127-1052A-; ....0555; Fuess....Sleglitz</b>
309	347	pipework
310	348	handle
311	349	baby shoe
312	350	shoe
313	351	Control for heated flying clothing - numbering on front panel; <b>126-541A-1; Bm.LVW5; FI.32403-3</b> also ↓ <b>Los</b> ; ↓ <b>Fest</b>
316	354	container
<b>Ammunition</b>		
304	342	cartridge case
305	343	20mm cartridge case



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Site location and sidescan sonar image, showing possible flightpath of the Ju 88

Figure 1

23/27/43

Form F. Norwegian.

INDIVIDUAL COMBAT REPORT.

65


Name of pilot. 2/Lt. Eriksen D.F.M.  
 Operation. Scramble.  
 Date. 20-4-43.  
 Squadron. 332(Norwegian).  
 Type of aircraft. Spitfire IX  
 Time of combat. 1150 hours.  
 Place of combat. 10 miles w.of Clacton on sea to 10 miles S.E. of Clacton.

Weather:- Clear.  
 Casualty to our aircraft. NIL  
 Casualty to our personnel. NIL  
 Enemy casualty. One Ju.88 destroyed.  
 Damage to the ground targets. NIL.

**GENERAL REPORT:-** I took off with Blue 2 on a scramble and we were ordered to Clacton at 30,000 feet. When we reached this position we were told to fly on 90 degrees at 34,000 feet. We did this and followed the smoke trails of an aircraft. We went up into the sun as the aircraft turned to port and went S.E. and then I saw it was a Ju.88. My No.2 was then about 500 yards behind me. I was about 350 yards away when I got on his tail and closed in easily to 250 yards. I gave 1 burst (1 Sec.) and the port engine caught fire. After the second burst, it flew off and I just managed to give a third burst but the e/a went over on its back and exploded. At this time smoke and flames came out and one of the crew baled out. I led my section back and landed at base.

.....  
 2/Lt. M. Eriksen D.F.M.

Ammunition used.		Port.		Starboard.	
Lt. Eriksen M.	20 MM	.303	.303	20MM	.303
	100	250	250	100	250
Lt. Herfjord K.	70	200	200	70	200
<b>Totals:-</b>		<b>340</b>	<b>20MM</b>	<b>1800</b>	<b>.303</b>

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SECRET.

A.I.(K)REPORT NO.180/1943.

THE FOLLOWING INFORMATION HAS BEEN OBTAINED FROM P/W. AS THE STATEMENTS MADE HAVE NOT AS YET BEEN VERIFIED NO MENTION OF THEM SHOULD BE MADE IN INTELLIGENCE SUMMARIES OF COMMANDS OR LOWER FORMATIONS, NOR SHOULD THEY BE ACCEPTED AS FACTS UNTIL COMMENTED ON IN AIR MINISTRY INTELLIGENCE SUMMARIES OR SPECIAL COMMUNICATIONS.

PLACE, DATE & TIME: In sea 5 miles off Clacton, Essex, (M.6326)  
20th April, 1943, 1145 hours.

TYPE & MARKS: Ju.88B T9 + FH

UNIT: ?

DISC: -

FELDPSTNUMMER: L.10490 (= Aalborg airfield)

AUSWEIS: -

START & MISSION: Started at 0830 hours on a reconnaissance flight, probably photographic. Place of start unknown.

1. This aircraft is stated by P/W to have been a Ju.88 B, with B.M.W. 801 engines and a crew of three.
  2. The pilot was flying westwards from the direction of the Dutch Coast at 32,500 feet and had neared the coast of East Anglia, when the rear-gunner reported two Spitfires at the same height. As a precaution, the pilot turned S.S.E. and headed towards Calais. He was not unduly worried about the presence of Spitfires at the same height, as he had confidence in the speed of his aircraft.
  3. No further warning was received from the rear-gunner, but the pilot thinks that the inter-comm. must have gone wrong, because ten minutes later the aircraft was suddenly attacked by a Spitfire.
  4. The Spitfire's shooting is stated to have been extremely good; the first burst hit the port engine, the boost-pressure fell, and within two minutes the aircraft was full of smoke. The aircraft lost height and the pilot believes that the remainder of the crew baled out from 26,000 feet.
  5. A second burst from the Spitfire went through the perspex, just missing the pilot, who then baled out from about 4000 feet. He came down in the sea and was picked up unconscious at 1330 hours by a naval Air/Sea Rescue launch. An empty rubber dinghy was found not far away, but there was no sign of the remainder of the crew.
  6. P/W was very security-conscious and refused details of his unit and place of start. He carried French and German money, but was emphatic that he had not started from France on this flight. The Feldpostnummer which he gave was identified during the Norwegian Campaign as being that of Aalborg airfield.
- Morale: Very high, but pleasant and talkative on non-service matters. He had been flying operationally since August 1942 and wore the E.K.I and II and the bronze (20) war-flights badge.
- Crew: Pilot: Leutnant Hans Joachim BAUMER - 6 Feb.12 - slight burns.  
Obs: Leutnant Paul HUNOLD - 33 - Missing, assumed dead.  
Gunner: Oberfeldwebel Hermann DIETZ - Missing, assumed dead.

A.I.(K)  
21. Apr. 43.

Distribution.

as for Report No. 172/1943.

*E.W. Smith*  
for S.D. Folkin, s/l  
Wing Commander.

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Plate 1: Damaged cockpit instrument console

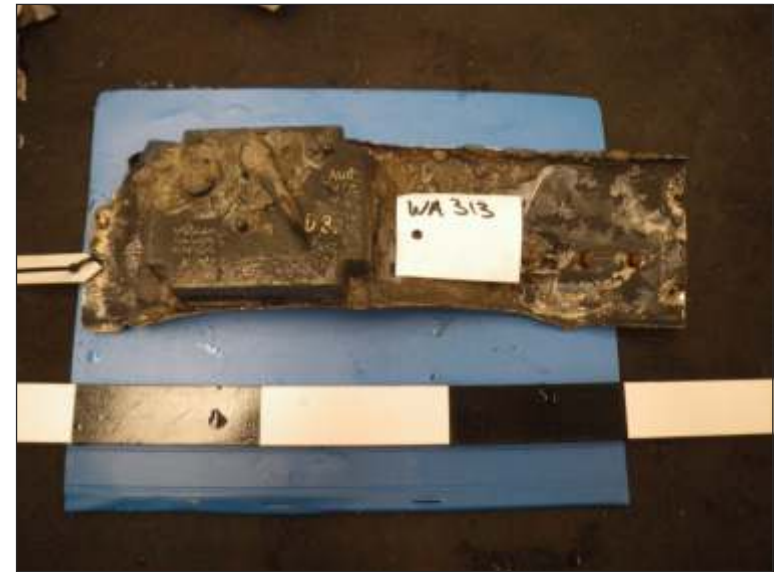


Plate 2: Control for heated flying clothing

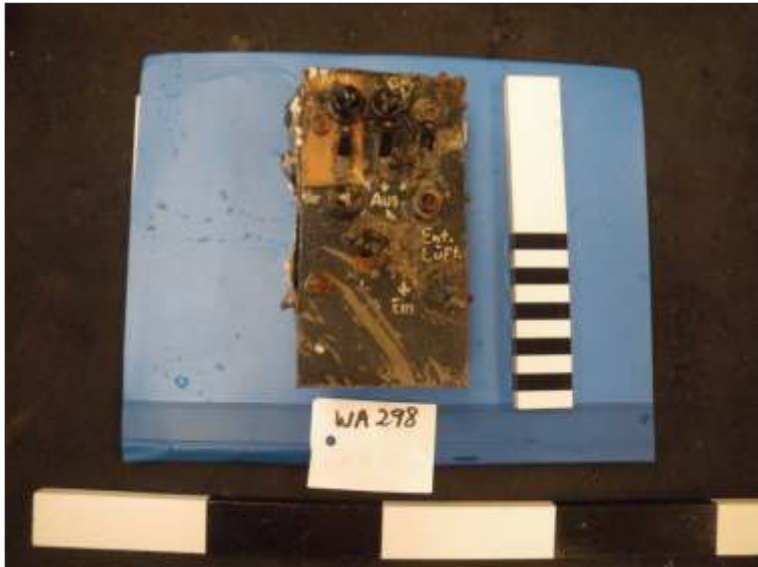


Plate 3: GM-1 boost control unit



Plate 4: BMW 801 14 cylinder radial engine (probably a G-2 version)

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Plate 5: VDM propeller



Plate 6: Possible Lysander propeller



Plate 7: Rb50/30 data plate



Plate 8: Expended British 20mm cannon shell, stamped 1952


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Plate 9: Luftwaffe stamp on oxygen cylinder



Plate 10: R8.88 stamp

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