The underwater aviation heritage of the Second Siege of Malta

Anthony Burgess and Timmy Gambin

Between the years 1940 and 1943, the skies over the Maltese islands and their surrounding seas witnessed some of the most intense aerial combat of the Second World War. The prolonged duration of this conflict in a relatively well-delineated area has resulted in a submerged legacy that bears witness to a period of rapid advancement in aviation technology. After discussing the potential size of this cultural resource, this paper will explain why all of the in situ aircraft remains from this conflict now exist underwater, as well as a working hypothesis as to its composition. This paper concludes by urging a re-appraisal in how this archaeological resource is regarded and treated, advocating a wider holistic approach to construct an 'airscape' of Malta during the Second World War.

Introduction

When Italy declared war on Great Britain and France on 10th June 1940, Malta's fighter force consisted of just four Gloster Gladiator bi-planes (Vella 1995, 3). By July 1943, as a springboard for the invasion of Sicily, Malta was the base for 35½ squadrons consisting of over 600 modern fighters and bombers (Air Ministry 1956, 428). Between these two dates, Malta served as both arena and audience to a struggle between the Allies (primarily Great Britain) and the Axis powers (Germany and Italy) for control of the supply routes to the military campaign in North Africa. Malta, as the only permanent Allied presence between Gibraltar in the west and Alexandria in the east, and occupying a key strategic position in the central Mediterranean, came to adopt a crucial role in this struggle, and the pre-eminence of this role is reflected in the archaeological record.

The Second Siege and the resultant aviation archaeological record

The Second Siege of Malta (hereafter referred to as 'the Siege') was in many ways an embodiment of the new power in twentieth-century warfare – aircraft. While naval forces did play a role, it was principally through aircraft that the Axis forces attempted to neutralise Malta's impact upon the Mediterranean theatre (Vella 1995; Spooner 1996; Canwell and Sutherland 2008). This was in large part due to Malta's proximity to a large number of Axis airfields in North Africa and Europe, and in particular Sicily (Fig. 1).

The Siege resulted in the large-scale loss of aircraft from all sides, and a number of factors (see *infra*) have had direct and profound consequences for the actual and potential archaeological record, on land and at sea. While this paper will focus upon the crashed aircraft remains from the Second World War (which as will be demonstrated effectively means aircraft underwater), it is important to note that Malta's aviation heritage (of which a large part is subsumed within the wider Second World War heritage) is of course not restricted to this. It also covers tangible infrastructure such as airfields – either in use, abandoned or adapted – and the intangible (e.g. recollections of events such as in Grech 2002), as well as aircraft preceding and succeeding the Second World War. However, restrictions of space will only permit this paper to focus on the material remains of those aircraft that crashed at sea during the Second World War.

Quantification and location of the crashed aircraft heritage

It is beyond the scope of this paper to quantify the full extent and accurate location of the entire underwater

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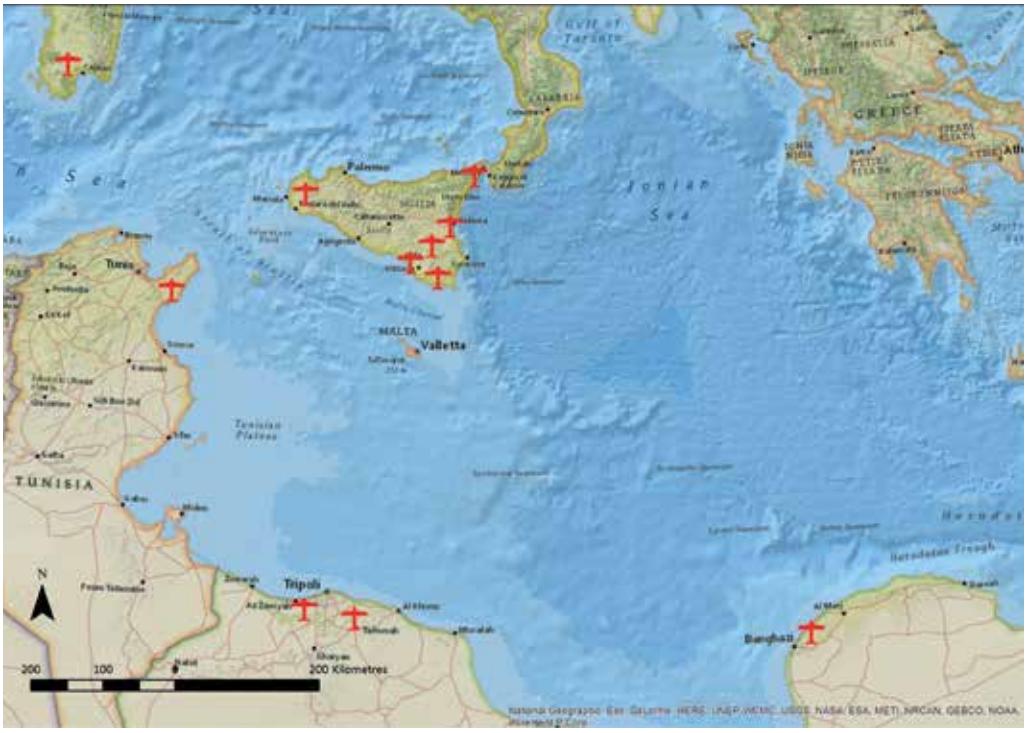

Figure 1. Alone in a hostile sea – Malta in 1941 (after Ministry of Information 1944).

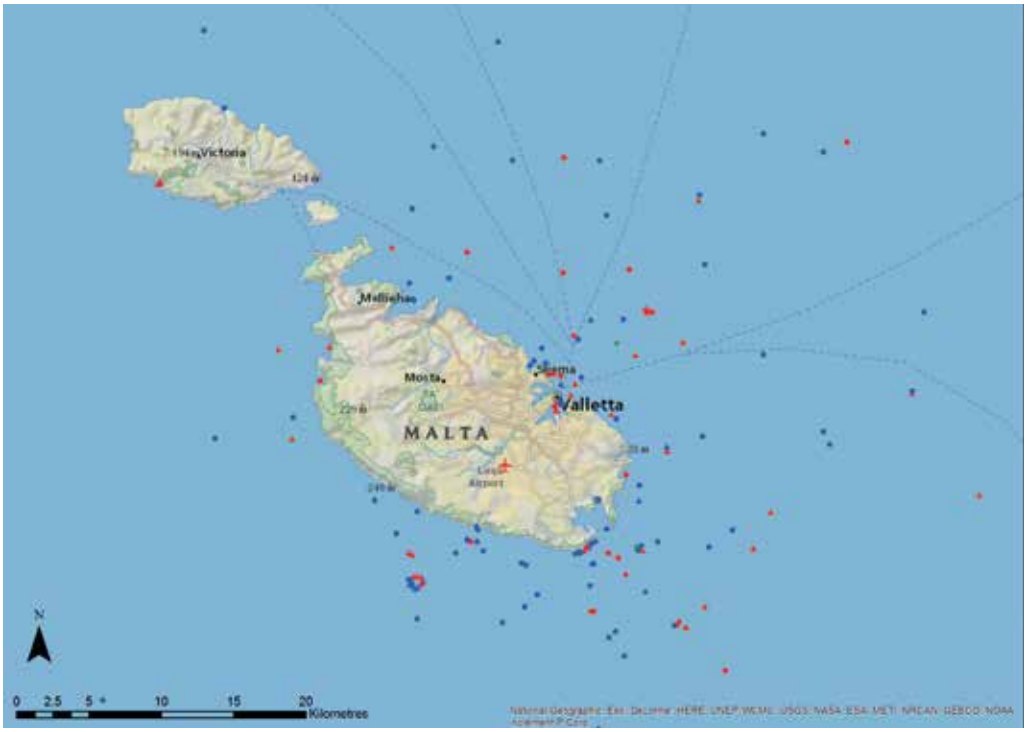

Figure 2. Map displaying aircraft by type (fighters as dots, bombers as triangles) with Allied aircraft in blue and Axis in red. Flying boats/ floatplanes (eight in total) are shown in green regardless of country. The apparent concentration of crash sites in some areas (e.g. around Filfla and the southern tip of Malta) are indicative of the lack of precision of much of the location data (see Table 1) as opposed to definitively located crash sites.

aviation archaeology (hereafter, UAA) from the Second World War in Malta. Such an undertaking would encounter a number of challenges, as has been shown by the work of Rogers on (largely terrestrial) aircraft crashes in Malta from 1940-42 (Rogers 2000b). More specifically, claims for enemy losses by the pilot or pilots responsible are not always reliable due to the distracting circumstances in which they occur (Wessex Archaeology 2008, 27) and aircraft can also be misidentified or not identified at all (Rogers 2000b). If an aircraft did crash, determining its precise location in wartime in a featureless seascape with few reference markers was problematic, with eye witness statements often differing widely (Rogers 2000b).

Where a pilot bailed out and where the aircraft finally crashed can be many kilometres apart (e.g. Galea 2002, 104). If the crew did manage to ditch the aircraft, they may have floated some considerable distance from the crash site (Wessex Archaeology 2008, 24).

The inherent unreliability of reports is then further undercut by the lack of record keeping in Malta. Space on inbound transports to besieged Malta was at a premium. For example, the interiors of gun panels on inbound fighter aircraft were used to transport supplies (Barnham 2013, 46). There was therefore little room for clerks, and some operational reports were compiled months after the events described. Such events were sometimes penned by men who were not even present at these events (Spooner 1996, xviii). Some records may have also been destroyed as was the case with the Luftwaffe (Wessex Archaeology 2008, 27). The log books kept by pilots and later stored were subsequently largely destroyed by the RAF in 1960 (Royal Air Force 2013). Therefore there is an unshakeable unreliability about the figures, even when British, Italian and German figures are compared.

However, an examination of some of the published figures can at least give some indication of the extent of the submerged aircraft record from the Second World War, although any figure must be treated with caution and is impeded by lack of precision regarding different time periods and varying areas of study used. The three main areas which witnessed aircraft crashes pertaining to the Siege were Malta and its surrounding waters, the stretch of sea between Malta and Sicily, and to a lesser degree the coast of North Africa (in particular Tunisia). Estimates are not always clear regarding which areas they relate to. For Axis aircraft, estimates vary from 1,252 destroyed over the island, with another 1,052 probable kills (Canwell and Sutherland 2008, 141), to 1,129 (Ministry of Information 1944, 7), approximately 860 (the RAF via Canwell and Sutherland 2008, ix) to 567 (Mifsud 1989, 77). The Soprintendenza del Mare estimates that at least 800 Italian fighters and bombers alone were shot down or crashed between June 1940 and August 1943, with 90% estimated to have fallen into the sea (Nobili and Palmisano 2010). For the Allies, estimates range from 840 aircraft lost (both on the ground and in the air) (the RAF via Canwell and Sutherland 2008, ix), to 568 (Ministry of Information 1944, 7). Modern estimates place RAF losses at 707 (547 in the air, 160 on the ground) (Ramsey 1975, 19; Canwell and Sutherland 2008, 141), but again no time frame or area is defined.

Despite such wide discrepancies in the figures, one can state with a degree of assurance that the potential is great and in need of further research, although it is again worth noting that arriving at a definitive number and firm location for these cannot be a realistic aim. The fact that a large proportion of these crash sites are submerged has also of course been detrimental to corroboration of witness statements and historical records.

As stated above, the Siege was primarily enforced via aircraft, and was not restricted to the skies above Malta. Allied aircraft used Malta as a base to cover wide stretches of the Mediterranean for numerous tasks including reconnaissance, transport between Gibraltar and Alexandria (and onwards to theatres further east e.g. Burma – see Leather 2012), and attacks on Axis assets on land and sea (Vella 1995; Spooner 1996; Canwell and Sutherland 2008). This far-reaching operational theatre means that the potential for finding Malta-based aircraft in any part of the central Mediterranean, and possibly beyond, is therefore high. Additionally, Malta's central location means that aircraft with little or no direct connection with Malta can also be found in its waters.

Local factors affecting deposition and condition of aircraft wrecks

Malta's geological composition, consisting chiefly of limestone (Pedley *et al.* 1976), with no rivers, marshlands or peatbogs, is not conducive to the preservation of aircraft crash sites on land. This brings it into sharp contrast to other parts of the world (such as the UK), where well-preserved aircraft have been found on land and inter-tidal areas many years after their deposition (EH 2002). In Malta uncontrolled aircraft often disintegrated and/or exploded upon impact with the hard ground (Rogers 2000a, 2000b), whilst the use of dry-stone walling to subdivide fields meant that semi-controlled/controlled aircraft that missed the runway were liable to be severely damaged (Playfair 1956, 45), certainly when compared to landing in a field in England (EH 2002). The tenuous supply situation during the Siege meant that cannibalisation of aircraft was commonplace, as was the adaptation of existing aircraft to meet local circumstances (Rogers 2000b; Cull and Galea 2008). The small size of the islands, the density of their population and their well-developed infrastructure meant that crashes on land rarely went unnoticed and these factors facilitated the ready recovery of crashed aircraft on land.

Grade	Type	Example	Quantity
1	Exact coordinates	34°36' N, 12°15' E	11
2	Bearing (point) and distance	DIngli (bearing 154°, 3 miles)	35
3	Descriptive	Dockyard Creek/Fort St Angelo	5
4	Cardinal point and distance	Valletta (5 miles N)	49
5	Cardinal point/bearing and approximate distance	Il-Blata Steps (bearing 210°, 1-3 miles)	2
6	Bearing (country) and distance	Malta (35 miles NE)	20
7	Place and distance	Kalafrana (5 miles)	21
8	Place or Place and cardinal point	Kalafrana or Delimara Point (S)	74
9	Cardinal point from country	Malta (N)	21
10	Significant land mass	Sicily	21
11	Sea with descriptive or cardinal point	Sea (south towards Benghazi)	4
12	Sea (no further details)	When no other information known bar that the aircraft crashed at sea	181

Table 1. Categories of aircraft crashes listed by grade with examples and quantities.

Function	GB	Germany	Italy	USA	Plotted/ Un-plotted	Within 24 nautical miles	Total
Air/Sea Rescue	1	0	0	0	0/1	1	1
Bomber	30	60	16	4	51/59	59	110
Dive Bomber	0	14	1	0	10/5	10	15
Reconnaissance	8	3	1	0	9/3	7	12
Torpedo Bomber	13	0	0	0	5/8	5	13
Fighter	220	29	30	2	133/148	142	281
Floatplane	3	0	2	0	3/2	3	5
Flying Boat	4	1	1	0	5/1	4	6
Unknown	0	1	0	0	1/0	1	1
Total	**279**	**108**	**51**	**6**	**218/226**	**232**	**444**

Table 2. A sample of the potential submerged aviation archaeological record from the Second Siege of Malta, broken down by aircraft type and country.

As a consequence, the likelihood of finding substantial aircraft remains from the Second World War on the Maltese islands themselves (despite 165 terrestrial crashes being catalogued – see Rogers 2000b) can be categorised as very low. However, there has been some limited success in finding fragments (Rogers 2000b). The high pace of development in Malta is also a threat to these terrestrial crash sites, with large tracts of rural land being cleared to accommodate housing and other building projects (Rogers 2000a). This makes the underwater remains all the more significant.

Mapping the potential underwater aviation archaeological record

Background and Methodology

Using primarily the records of the Allied Air/Sea Rescue (ASR) service operating from Malta, and first-hand testimony and records of such (e.g. diaries) as collated in Galea (2002), coupled with some additional information and corroboration from Rogers (2000b) and the Ministry of Information (1944), it was possible to collect a wide enough database (444 crashed aircraft) with which to conduct a broad statistical and

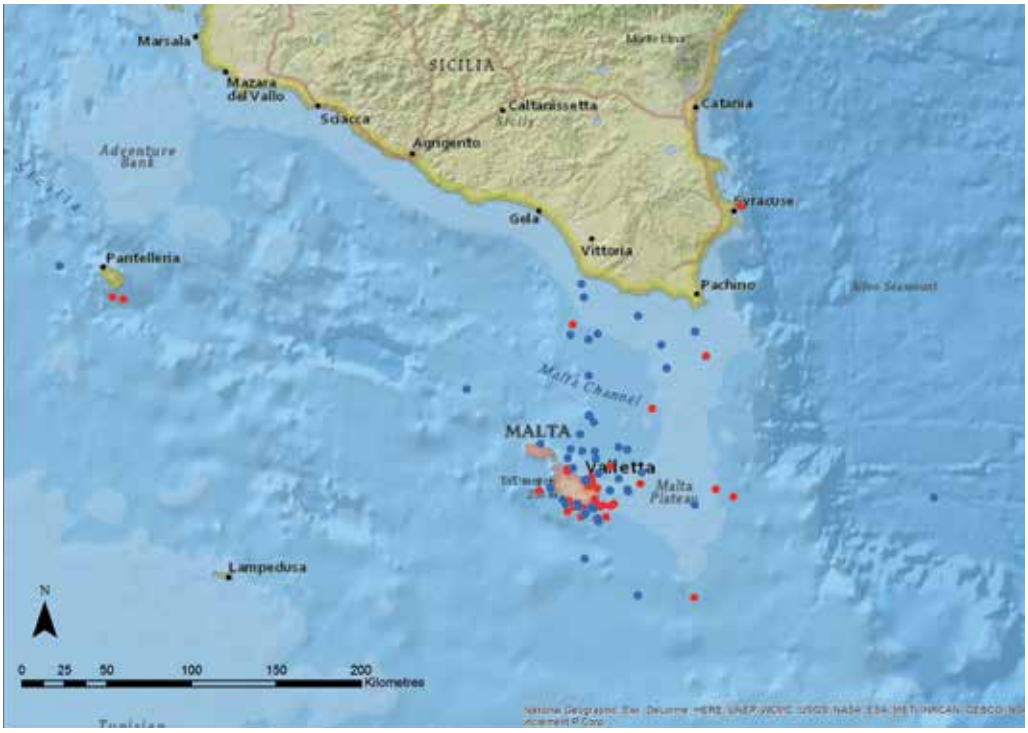

Figure 3. Allied fighter aircraft crash sites (not including Beaufighters) before and after July 1942. Total numbers for pre-July 1942 (shown in red)=41, post-July 1942 (shown in blue)=53.

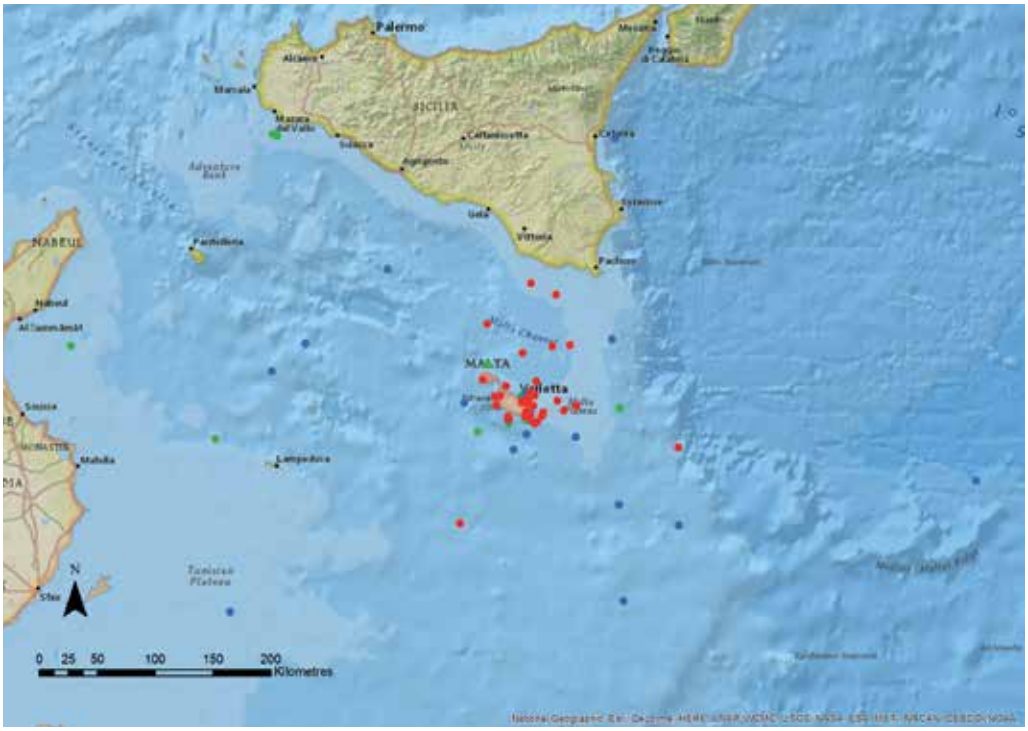

Figure 4. British and Axis bomber crash sites (including Beaufighters). Total numbers for British (shown in blue)=29, Axis (shown in red)=44, and Beaufighters (shown in green)=12.

spatial analysis of the potential Second World War UAA of Malta. While the records of a service whose focus was on ditched aircraft provides an excellent starting point, it is important to stress that this should not be considered a definitive quantification of the UAA heritage, as this would require in-depth study of numerous sources in disparate locations currently beyond the resources of the authors of this paper. One must also exercise caution in posing hypotheses that are too specific for the data in hand, and bear in mind the limitations of primary sources. These include the effective range of the ASR service, the physical and operational constraints under which they worked, and the impact of discrete events such as mechanical failure

and enemy action (Galea 2002). This is an attempt to move beyond the event-focused methodology that has tended to dominate aviation archaeology (Ford 2006), and to examine the record (or at least a section of it) holistically, in order to ascertain broad trends and to show the potential that a more robust and comprehensive survey of the UAA from the Second World War could bring. Due to the paucity of much of the information in hand regarding the actual site of the crashes, of the 444 entries, only 217 had sufficient location data (however approximate) to allow them to be plotted (those graded 1-8) using the Geographic Information System (GIS) ArcGIS 10.1 (Fig. 2), and these coalesced into 12 categories (Table 1).

Statistical Analysis

One of the most noticeable differences is the high number of Allied fighter aircraft reported crashed (220 – 79% of British aircraft) compared to Germany (29 – 27% of German aircraft) and Italy (30 – 58% of Italian aircraft) (Table 2). There are a number of possible explanations for this. The first lies in a higher ratio of Allied fighter aircraft compared to those of other types due to the priority given to gaining control of the air. Secondly, Allied pilots were under orders to cut through the fighter escorts and attack Axis bombers (Canwell and Sutherland 2008, 79; Barnham 2013). Thus the priority of the Allies was to attack Axis bombers, that of the Axis escorts to attack the Allied fighters. Another possibility of course is that the Allied ASR concentrated its efforts upon Allied crashed aircraft. These statistics also provide evidence for the propensity for finding Allied aircraft in Maltese waters as stated above.

There are no significant differences in the relative proportion by function when one compares those within the total amount (444), those plotted (217), or those within 24 nautical miles (232).[1] However, further investigation by function shows that there are variations in percentages of those within 24 nautical miles of Malta. Dive bombers for example have a higher percentage (66%) within 24 nm than fighters (50%) or other bombers (54%). Caution must be exercised, however, as the total number of dive bombers (15) is significantly less than fighters (281) or bombers (110). This percentage (66%) is also distorted in that all *known* locations are within 24 nm; the other five are unknown (including a set of four on the same date), and therefore the percentage within 24 nm could potentially be higher, but not lower. Dive bombers were especially vulnerable to counterattack immediately after their dive, which was when opposing fighter aircraft tried to attack (Wragg 2003, 158). Additionally, if the target of a dive bomber attack is known, it is possible to anticipate their dive trajectory and interdict them via the use of a 'box barrage', as was used in the defence of *HMS Illustrious* in January 1941 (Playfair 1956, 46). With all the above in mind, one can therefore anticipate that a disproportionate amount of dive bombers is likely to be found within Maltese waters compared to aircraft performing other functions.

Spatial Analysis

July 1942 saw the adoption of the policy of 'forward interception' (i.e. intercepting Axis aircraft before they reached Malta) (Canwell and Sutherland 2008, 106) and the consequences for the potential archaeological record can clearly be seen when pre- and post-July 1942 Allied fighter aircraft crash sites are compared (Fig. 3).

There is a strong concentration of reported Allied fighter aircraft crash sites around Malta before this date, reflecting how the skies above the islands and their surrounding seas provided the main battleground at this stage of the war. Post-July 1942, there is a marked preponderance in the potential archaeological record of Allied fighter aircraft to the waters north of Malta, right up to Sicily, compared to the same category pre-July 1942. When broken down by type (Hurricane/Spitfire), with one exception, no Hurricanes are reported crashed post-May 1942, no doubt due to their large-scale replacement with the more capable Spitfire from early 1942 (Holland 2003, 194; Canwell and Sutherland 2008, 67). It is therefore likely that any Allied fighter aircraft (or parts thereof) found in the northern section of the Sicilian Channel are Spitfires.

Looking at reported offshore crash sites for British and Axis bombers (including dive, reconnaissance and torpedo variants), one may observe a pattern emerging here as well (Fig. 4). The wide-ranging theatre of operations is reflected in the scattered nature of reported British bomber wrecks. This is further underlined when Beaufighter wrecks are added. Beaufighters were not used to intercept incoming Axis aircraft to Malta (except as night fighters – Canwell and Sutherland 2008, 67) in the same fashion as Hurricanes or Spitfires, but as fighter escorts for bombers on long range strike missions or as strike aircraft themselves (Scutts 2004, 70-74).

Closer examination of the immediate waters

around Malta also shows that 11 of the 16 entries within 4.8 km (3 miles) of Filfla are bombers. As an easily discernible feature in the seascape approximately 10 km west-south-west and south-west of the Fleet Air Arm airfield at Ħal Far and the RAF airfield at Luqa respectively, Filfla would have provided a highly visible navigational marker to aircraft returning to these airfields, and indeed was used as the focus for bombers waiting to land at Luqa (Ray Polidano *pers. comm.* 2013). For Axis bombers, it may have acted as a waypoint as they sought to bomb these same airfields.

Conclusions and future work

It is clear from the potential UAA record that the territorial waters of Malta (and beyond) are home to a diverse and plentiful number of crashed military aircraft. The intense Allied and Axis focus on Malta during the Second World War has resulted in a submerged 'catalogue' of military aircraft from both sides during the Siege. As such it constitutes an irreplaceable underwater heritage zone, one worthy of much deeper study than has hitherto been undertaken, and for which the preliminary work and analysis above should be viewed as a marker for what could be achieved with a more comprehensive and robust database. Such a database will include information such as home airfield, planned destination/target, reason for the crash etc., drawing upon a wider number of sources including Axis ASR services, RAF Operations Record Books and oral testimonies. Studied in conjunction with overarching historical data (the full gamut of tangible and intangible sources), these could be used to construct an 'airscape' of Malta during the Second World War in a similar fashion to the way maritime archaeologists use equivalent maritime data to construct 'maritime landscapes' (Westerdahl 1992). Additionally, making this resource available online, as has already occurred with other databases such as the Transatlantic Slave Trade Database (TSTD), would allow independent researchers to interrogate this resource to answer their own hypotheses, whilst acting as a focus for (and an index to) more detail with regard to individual crash sites. It is also the intention of the authors to expand their research in the field of underwater airplane crash sites in waters surrounding the Maltese Islands including those areas of seabed that are over 50 metres deep.

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Notes

1 Article 149 of the United Nations Convention on the Law of the Sea states that: 'All objects of an archaeological and historical nature found in the Area [24 nautical miles] shall be preserved or disposed of for the benefit of mankind as a whole, particular regard being paid to the preferential rights of the State or country of origin, or the State of cultural origin, or the State of historical and archaeological origin'.