Royal Navy Trade Defense in the English Channel during the First World War

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Abstract

This chapter examines the development of Royal Navy and Allied trade defence and anti-submarine (A/S) methods in the English Channel during the First World War. The Royal Navy utilized an adaptive approach that provided the Channel's Senior Naval Officers (SNOs) with significant latitude when determining how to conduct trade defence in their areas of responsibility. Despite the importance of the three most important commands, Dover, Portsmouth and Plymouth, only Dover is well served historiographically. This chapter examines the evolution of the A/S and trade defence measures in each region, and argues that when the war ended the Allies had devised a comprehensive and effective A/S and trade defence system in the Channel, to which Germany's U-boat could not respond with any hope of success.

Introduction

The primary role of the Royal Navy in the First World War was to protect seaborne commerce and communications, and there was no greater challenge to the flow of oceanic trade than Germany's unrestricted submarine campaign of 1917 – 1918. Since the wars with Louis XIV the protection of trade had been critical to England's national survival, and the Western Approaches and English Channel were the decisive theatres, where command of the sea mattered the most. William III crossed the English Channel by utilizing seapower at the beginning of the War of the League of Augsburg, and the privations of Spanish, Dutch and French commerce raiders during the War of Spanish Succession were so significant that the newly United Kingdom was forced to introduce compulsory convoys in 1707. The defence of trade was no less significant for the conduct of distant colonial campaigns during the Seven Years War, and the protection of merchant shipping necessitated a strict convoy policy during the American Revolutionary War.[1] The Act of 1798 once again granted the Admiralty the power to enforce the convoy system on oceanic merchants,[2] and indeed it was control of these vast supply lines, and the mobilization of

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[1] Andrew Lambert, "The Royal Navy and the Defence of Empire, 1856 - 1918," in *Imperial Defence: The Old World Order 1856 - 1956*, ed. Greg Kennedy, Cass Military Studies (London: Routledge, 2008), 111–32, p. 112. N. A. M. Rodger, *The Command of the Ocean* (New York: W. W. Norton & Company, 2006), p. 359, 367

[2] John Terraine, *Business in Great Waters: The U-Boat Wars, 1916-1945*, Kindle ebook (Barnsley: Pen & Sword Military, 2009), part 1, chapter 3, loc. 1223

capital and credit this enabled, that contributed so profoundly to victory against Napoleon's Empire.[3]

The legal basis for the protection of oceanic trade and the rules of engagement for maritime warfare were codified for what Stephen Cobb described as the new 'liberal age of free trade' that emerged in the decades following the Congress of Vienna.[4] Privateering was abolished by the 1856 Declaration of Paris and the rights of neutrals during naval blockade reinforced by the 1907 Hague Conference and the 1909 Declaration of London.[5] Warships engaged in trade interdiction were expected to follow prize law, necessitating basic consideration for the crews of captured ships and assuring the safety of passengers.[6] By 1914 the Royal Navy's conceptualization of trade defence had transitioned from the traditional, 18th century, combination of convoy escort and close blockade to a geographically globalized, *laissez faire,* model that provided for the security of oceanic communications and trade routes through command of the sea.[7]

The outbreak of the First World War put Britain's global strategy to the test. The Royal Navy, working with the *Entente* navies of France and Russia, quickly swept Germany's merchant shipping from the seas and began intercepting neutrals bound for North Sea ports, so as to confiscate goods destined for Germany.[8] A proposal to restrict Germany's imports was hammered out by the Restriction of Enemy Supplies Committee (with members drawn from the Foreign Office, Board of Trade and the Admiralty), supplemented in November by the Foreign Office's Contraband Committee, and an elaborate diplomatic treaty framework was negotiated

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[3] Roger Knight, *Britain Against Napoleon: The Organization of Victory, 1793 - 1815* (St Ives plc: Penguin Books, 2014), p. 390-414

[4] Stephen Cobb, *Preparing for Blockade, 1885-1914: Naval Contingency for Economic Warfare* (Farnham: Ashgate, 2013), p. 62

[5] Ibid., p. 62-76. Eric Osborne, *Britain's Economic Blockade of Germany, 1914-1919* (London: Frank Cass Publishers, 2004), p. 26 et seq

[6] Steve Dunn, *Bayly's War: The Battle for the Western Approaches in the First World War* (Annapolis: Naval Institute Press, 2018), p. 30

[7] R. M. Bellairs, 'Historical Survey of Trade Defence since 1914,' *Royal United Services Institution Journal*, vol. 99, no. 595 (1954): 359–77, p. 363. See also, Andrew Lambert, 'The Royal Navy and the Defence of Empire, 1856 - 1918,' in *Imperial Defence: The Old World Order 1856 - 1956*, ed. Greg Kennedy, (London: Routledge, 2008), 111–32, p. 112, 124-6

[8] This procedure involved both a liberal application of the controversial 'continuous voyage' justification for seizure and the expansion of the contraband list to include essentially anything imported by the Central Powers, a serious aggravation of neutral interests including that of the United States. Arthur Marder, *From The Dreadnought to Scapa Flow*, [hereafter *FDSF*] II, 5 vols. (Barnsley: Seaforth Publishing, 2013-4), p. 372-7. See also, Osborne, *Britain's Economic Blockade*, p. 59-63

between Whitehall, Paris, and the European neutrals, to financially and economically isolate the Central Powers.[9]

After Germany's offensives on the Marne and at Ypres failed to generate a decisive outcome on land, Britain and the Allies tightened their economic blockade. The Admiralty, in an effort to force neutral shipping through the Dover Straits, where it could be more easily inspected and controlled, on 5 November declared the entire North Sea a military area.[10] Two days later Admiral Hugo von Pohl, Chief of Germany's *Admiralstab*, threatened to unleash the U-boats by January 1915.[11] Despite opposition from Grand Admiral Alfred von Tirptiz, Pohl, promoted to command of the High Sea Fleet as Friedrich von Ingenohl's replacement after the Battle of the Dogger Bank, got his wish, with the Kaiser's blessing. On 4 February 1915 the U-boats were indeed loosed against Britain's merchant shipping in the 'War Zone' established around the British Isles.[12] On 7 July 1916 Britain abandoned the last vestiges of the Declaration of London and implemented a total blockade. Germany responded with unrestricted submarine warfare: aimed at starving Britain out of the war. This was a dangerous gamble, likely to add neutral powers to the growing list of nations fighting against the Central Powers, but might just be worth if it forced the British, and by extension the French and Americans, to a negotiated peace.[13]

During the following two years of maritime conflict Germany's submarines dealt a heavy blow to British and indeed global merchant shipping. There was a marked reluctance at the Admiralty to admit that the pre-war conceptualization of trade defence based on independent sailings was no longer viable. As Nicholas Black observed, the Admiralty Staff's attitude towards the regulation of oceanic trade constituted a 'mental block' that had 'clearly formed in the age before the advent of the submarine.'[14] Archibald Hurd, the official historian of Britain's

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[9] A. C. Bell, *A History of The Blockade of Germany and of the Countries Associated with Her in the Great War*, reprint (Uckfield: The Naval & Military Press Ltd, 1961), p. 61 et seq. Osborne, *Britain's Economic Blockade*, p. 64-72, 75-7

[10] Osborne, *Britain's Economic Blockade*, p. 74

[11] Lawrence Sondhaus, *German Submarine Warfare in World War I: The Onset of Total War at Sea* (New York: Rowman & Littlefield Publishers, Inc., 2017), p. 15-6, 28

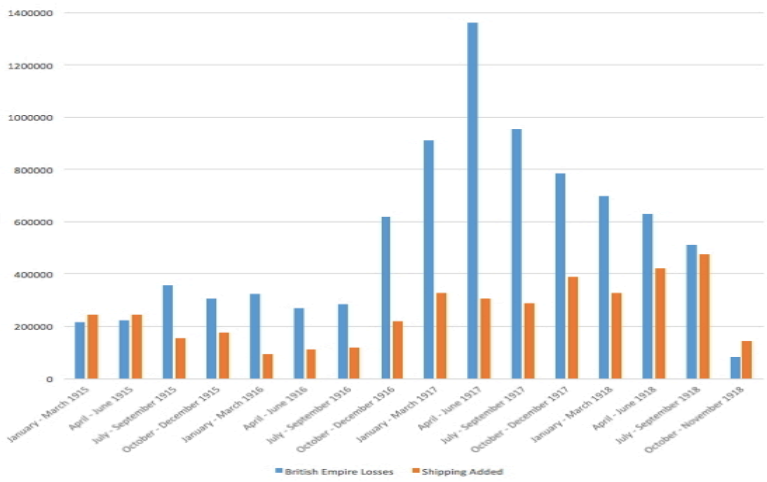
[12] Ibid., p. 30-1, John C. G. Rohl, *Wilhelm II: Into the Abyss of War and Exile, 1900-1941*, trans. Sheila de Bellaigue and Roy Bridge, Kindle ebook, III, 3 vols. (New York: Cambridge University Press, 2014), p. 1151

[13] Steve R. Dunn, *Blockade: Cruiser Warfare and the Starvation of Germany in World War One*, Kindle ebook (Barnsley: Seaforth Publishing, 2016), p. 117-9. V. H. Danckwerts, "1807 - 1917: A Comparison," *Naval Review Journal* 8, no. 1 (1919): 14–30, p. 23. See also, Osborne, *Economic Blockade of Germany,* p. 128-32

[14] Nicholas Black, "The Admiralty War Staff and Its Influence on the Conduct of the Naval War between 1914 and 1918" (PhD thesis, London, University College London, 2005), p. 72-3

merchant navy, stated that 'there was no conception that any Power, in however desperate straits, would not merely ignore the recognised principles of international law as they applied to naval warfare, but would disregard customs of the sea which for centuries had been considered a binding code of honour by seaman of all nations.'[15] The U-boats, sinking targets on sight and undetectable beneath the waves, posed a serious threat to Britain's vital system of seaborne communications and demonstrated, as Paul Kennedy phrased it, that the Admiralty's pre-war defence schemes were 'quite out-of-date.'[16]

Ultimately the Admiralty Naval Staff began to implement schemes for oceanic, and later coastal, convoys that gradually, between April 1917 and June 1918, became comprehensive. It was this extensive convoy system, constituting the near total regulation of trade in the Atlantic, Western Approaches, English Channel, North Sea, and Mediterranean, that finally staunched the Allies' shipping losses. By the summer of 1918 new construction in British and Allied shipyards began outpacing sinkings as the crisis was at last surmounted.



Merchant shipping losses and net shipping additions for the British Empire from January 1915 to November 1918.[17]

Although the essential narrative of this conflict is well established, the specific regional intricacies remain underappreciated. In the English Channel the U-boats and the Allies' escorts

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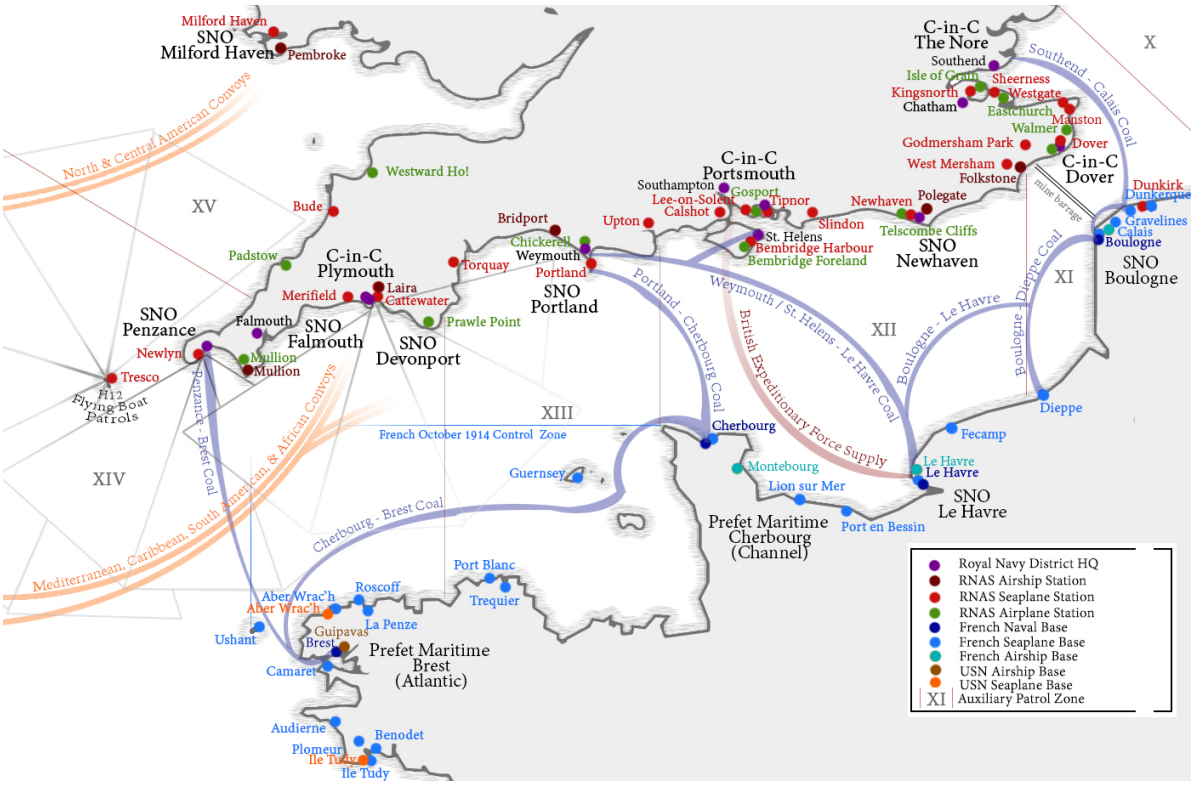
[15] Archibald Hurd, *The Merchant Navy*, III, 3 vols, reprint (Uckfield: Naval & Military Press, 1921-9), p. 365-72

[16] Paul M. Kennedy, *The Rise and Fall of British Naval Mastery* (New York: Humanity Books, 1976), p. 253

[17] C. E. Fayle, *Seaborne Trade: Submarine Campaign*, II, 3 vols, reprint (Uckfield: Naval & Military Press Ltd, 1920-4), Appendix C II, V(a), & J. A. Salter, *Allied Shipping Control, An Experiment in International Administration* (Oxford: Clarendon Press, 1921), Table No. 8, p. 361-3

were waged in a constant reaction cycle, the Germans concentrating forces as the Allies rerouted shipping and then, between May and August 1917, reacting to the introduction of inbound and outbound convoys. As these convoys reduced losses in the Western Approaches and in the cross-Channel trade, U-boats sought targets closer to the coasts and in the confined waters of the Irish sea. The Channel became a priority for the small, short-ranged minelaying and coastal U-boats based on the coast of occupied Belgium.

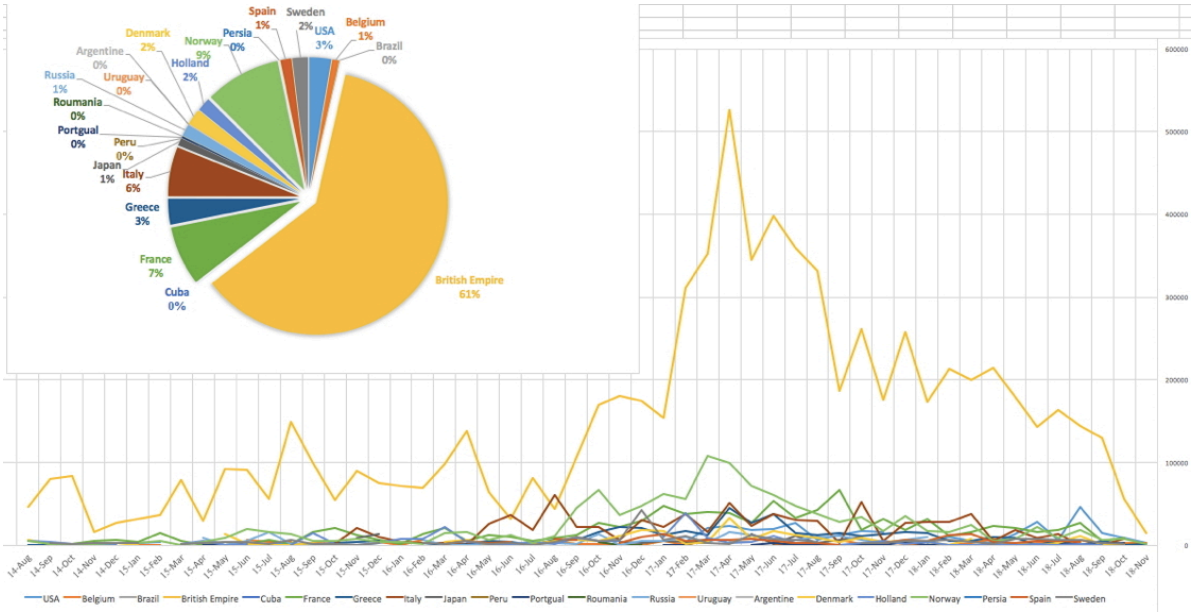


Map showing Channel District HQs, RNAS seaplane, airplane, airship and balloon bases (note the 'spider web' flying boat patrols), French CAM, dirigible and naval bases, outbound convoy route assembly points,[18] and French coal trade routes. Note in particular the original October 1914 control zone, dividing the Western Channel into British (north) and French (south) areas of responsibility. Not also the auxiliary patrol zones.[19]

[18] Upon their arrival inbound convoys were directed to either East or West coast ports, including up-Channel to Dover and on to London. The most important convoy assembling ports were Devonport, Milford Haven, Lamlash and Liverpool. Merchants destined for France were met by French escorts and detached. For details of the convoy organization see Fayle, *Seaborne Trade,* III, p. 134-7, 307-17, 472, Paul M. Kennedy, "The War at Sea," in *The Cambridge History of The First World War*, ed. Jay Winter, I, 3 vols. (Cambridge University Press, 2014), 321–48, p. 340, William Sims, *The Victory at Sea* (Annapolis: Naval Institute Press, 2016), p. 139. The subject of Channel convoy routing control is detailed in English Channel: Various Subjects, July-August 1917, TNA ADM 137/1339

[19] Ray Sturtivant and Gordon Page, *Royal Navy Aircraft Serials and Units, 1911-1919* (Tonbridge: Air Britain (Historians) Ltd, 1992), p. 464, Hobbs, *The Royal Navy's Air Service*, p. 486-7, Roskill, *Documents*, Appendix

The submarine war in the Channel was fought across three key districts: Dover, the bottleneck controlling access to the North Sea; Portsmouth, where supplies for the British armies and the critical coal trade crossed the Channel into France; and Plymouth, the base for operations in the vital Atlantic approaches, upon which Britain's capacity to continue the war rested. Analysis of shipping losses in the areas of responsibility for these three Channel districts reveals interesting details that have hitherto been subsumed by the broader conflict. The Royal Navy's Channel SNOs, in cooperation with their French counterparts, developed three distinct approaches to sea control and the protection of trade, reflecting geographical and operational variances across the theatre. It was ultimately this complex aggregate of methods and materials that demonstrated, as Andrew Lambert has phrased it, that 'there was no easy answer' to the submarine crisis.[20]



Allied and neutral shipping losses during the First World War.[21]

The Statistical Struggle

II, p. 748-51. See also, Marder, *FDSF*, I, p. 422-3, Corbett, *Naval Operations*, II, & Morareau et al., *L'aviation Maritime Francaise*. Special thanks to Dr. Thomas Vaisset for assistance with this map.

[20] Marcus Faulkner and Andrew Lambert, *The Great War At Sea, A Naval Atlas, 1914 - 1919* (Barnsley: Seaforth Publishing, 2015), p. 35-7

[21] Salter, *Allied Shipping Control*, Table No. 6, p. 355-9

At the macroeconomic scale the events of the submarine crisis are well known: sustained unrestricted submarine warfare, on the basis of calculations supplied by Germany's Chief of the Naval Staff Admiral von Holtzendorf, at a monthly sinking rate of 600,000 tons would force Britain to a negotiated peace. The U-boats' operational tempo accelerated in February 1917 and 520,000 tons of merchant shipping were sunk that month.[22] The loss rate accelerated in the spring, the U-boats achieving their greatest monthly total in April, with British losses nearing 600,000 tons and total world losses surpassing 860,000 tons.[23] The result of this action, as was expected by the German supreme command,[24] was that the United States declared war against Germany on 6 April, a grave development for the future of Germany's war effort and a boon to Allied trade defence efforts which could now be systematically coordinated across the Atlantic. Although April was the month during which the crisis of the naval war came to a head, in the Channel itself the peak of sinkings had actually been reached the month before when 180,000 tons of British, Allied and neutral shipping was sunk or damaged. This included neutral ship such as the 5,225 ton American oil tanker *Illinois*, scuttled by *UC21* north of Alderney on 18 March, one of a string of indiscriminate sinkings of American merchantmen that contributed to President Woodrow Wilson's balance sheet in favour of intervention.[25] Tonnage totals steadily declined thereafter, reaching a local nadir in August when not much more than 85,000 tons were sunk and damaged. This local trough coincided with the introduction of outbound, and later inbound, Atlantic convoys which forced the U-boats to refocus on coastal waters and the Mediterranean. The progress of the campaign from this point on is summarized by the chart below.

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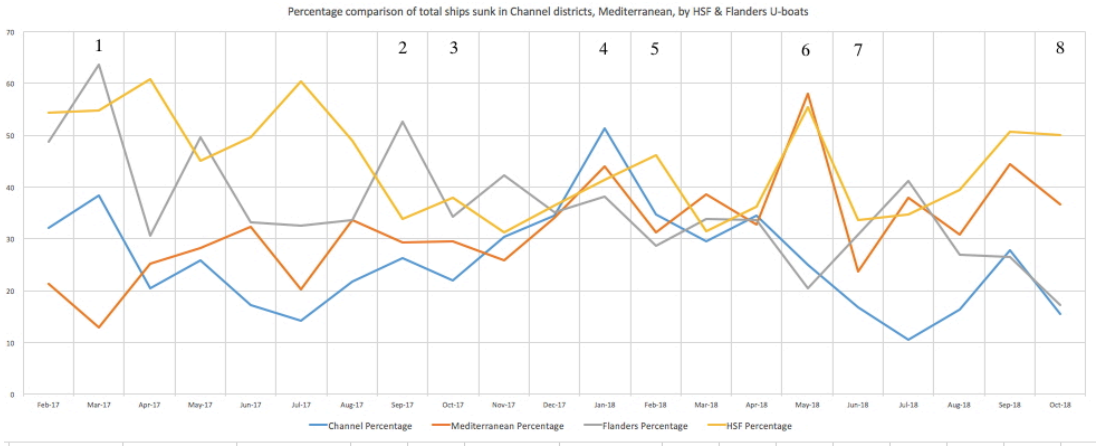
[22] Andreas Michelsen, *Submarine Warfare, 1914-1918* (Miami: Trident Publishing, 2017), p. 37-8, Reinhard Scheer, *Germany's High Sea Fleet in the World War*, Kindle ebook (Shilka Publishing, 2013), p. 301-8

[23] Kennedy, "The War at Sea," p. 339

[24] Erich Ludendorff, *Ludendorff's Own Story, August 1914 - November 1918*, Forgotten Books reprint, II, 2 vols. (London: Hutchinson & Co., 1919), p. 415-8, Rohl, *Wilhelm II: Into the Abyss,* III, p. 1154

[25] Sondhaus, *German Submarine Warfare*, p. 114-5



Summary based on Arthur Marder's totals showing percentage of ships sunk in Channel and Mediterranean, compared to sinkings inflicted by Flanders flotilla and High Sea Fleet U-boats.[26] Key events highlighted.

In March 1917 (1) the coastal U-boats based in Flanders reached their greatest effectiveness, destroying the largest quantity of Channel shipping in a single month. Following the American declaration of war on 6 April the Channel became less significant as both the High Sea Fleet and Flanders U-boats concentrated on the crowded shipping lanes in the Atlantic and Western Approaches. The rolling introduction of inbound and outbound convoys had, by September (2), dramatically reduced the effectiveness of the High Sea Fleet's long range U-boats as their targets became organized and defended, although this meant renewed importance for the Flanders boats in terms of mining and coastal attacks against the convoy dispersal points in the Channel, and along the Welsh and Irish coasts at Milford Haven and Queenstown.[27] In the Mediterranean the introduction of convoy methods in October (3) likewise reduced the value of that theatre compared to the increasing value of the Channel.[28] In December 153,975 tons were sunk and damaged in the Channel, a performance that was nearly repeated in January 1918 (4) when 139,010 tons and 63 ships were sunk and damaged, at which point the Channel in fact became *the most significant theatre* in that the majority of ship sinkings were taking place there, representing 47% of total tonnage sunk (the Mediterranean was still worth slightly more tonnage at 50%).

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[26] Marder, FDSF, IV, p. 102, 182, 277 & V, p. 78. Newbolt, *Naval Operations*, V, Appendix C I, p. 409-11. Innes McCartney, "The Archaeology of First World War U-Boat Losses in the English Channel and Its Impact on the Historical Record," *The Mariner's Mirror* 105, no. 2 (May 2019): 183–201, Table 3, p. 200

[27] Dunn, *Bayly's War*, p. 184-5, Sondhaus, *German Submarine Warfare*, p. 145-8

[28] Marder, FDSF, IV, p. 261

This triumph for Germany was short lived, however, as operational U-boat numbers reached their wartime maximum,[29] and the vast increase in the effectiveness of the Dover barrage as a result of increased mine quality and production rates, combined with patrol reforms implemented by Vice Admiral Roger Keyes, noticeably curbed the effectiveness of the Flanders' U-boats in February (5). Within a few short months it was clear that the Allies had successfully contained the situation in the Channel, and the audacious raids at Zeebrugge in April and Ostend in May (6) highlighted the difficulty the Flanders boats were experiencing at the concurrent time that the decisive measure of coastal convoys was being implemented. This latter regulation of coastal trade was the final element in the convoy equation that now forced the U-boats, in desperation, to attempt the first concentrated attacks against convoys. This development, as John Terraine phrased it, cast 'ominous shadows towards the distant future,' – the deadly convoy battles of the Second World War,[30] although in this case the effort was premature and ultimately unsuccessful and furthermore dangerous as the British Direction-Finding (D/F) system could locate U-boats by their Wireless Telegraphy (W/T) transmissions.[31] The U-boats instead abandoned the Western Approaches altogether and turned, at the limits of their endurance, to the American and Canadian coasts and, at ever greater risk, to the Channel.[32]

Although the High Sea Fleet U-boats' efforts to combine against convoys in the Atlantic proved illusory they were experiencing a brief renaissance in the Mediterranean, where 173,172 tons was sunk or damaged, representing 65 ships or 58% of the total tonnage for May. The Channel meanwhile yielded only 29% of that month's tonnage, representing a meagre 25 ships. By June (7) Brigadier-General Charles Lambe's Royal Air Force (RAF) forces at Dover and Dunkirk was dropping 120 tons of bombs a month on the Belgian U-boat bases, while in the Channel a mere 17 ships were sunk (and three damaged), representing only 46,214 tons, hardly 17.2% of the 268,505 tons the U-boats managed to destroy that month. Although in August losses in the Channel increased to 72,623 tons (17 ships with five more damaged), the effectiveness of the coastal U-boats was declining. 58,000 tons were sunk and damaged in the

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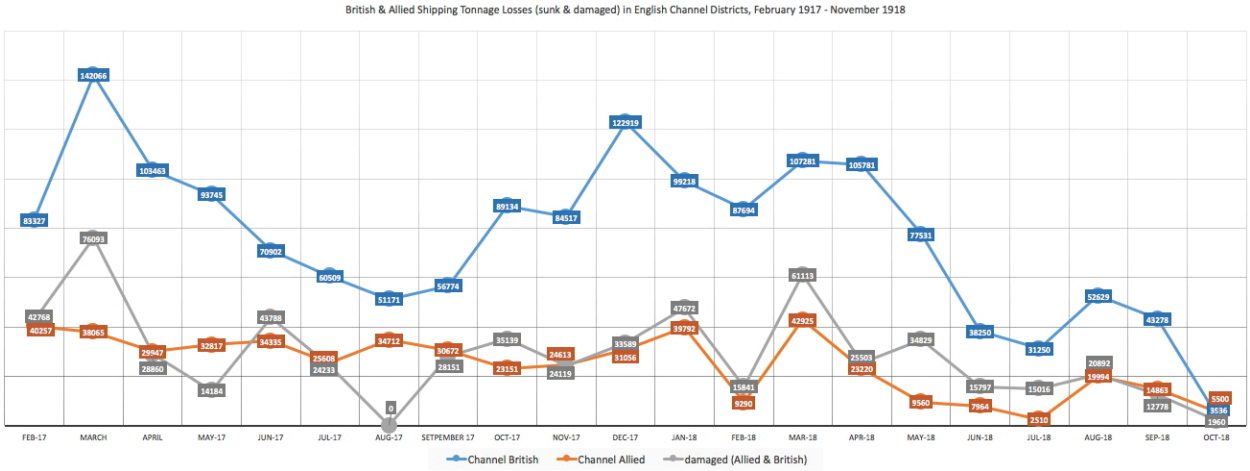
[29] R. H. Gibson and Maurice Prendergast, *The German Submarine War, 1914-1918*, Reprint (London: Naval & Military Press, 1931), p. 205. See also Marder, *FDSF,* V, p. 81

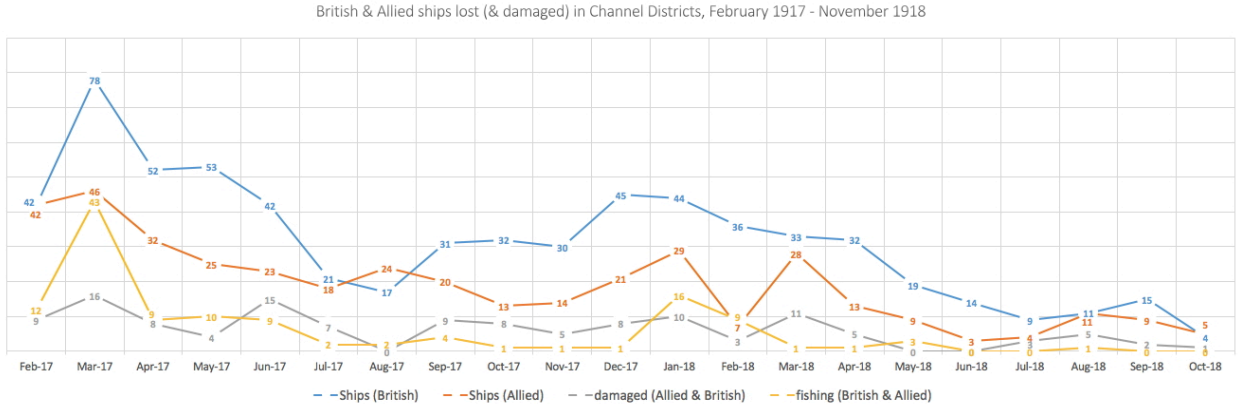
[30] Terraine, *Business in Great Waters*, part 1, chapter 6, loc. 2413. Newbolt, *Naval Operations*, V, p. 278-81

[31] Sondhaus, *German Submarine Warfare*, p. 145, Dwight Messimer, *Find and Destroy: Antisubmarine Warfare in World War I* (Annapolis: Naval Institute Press, 2001), p. 177, Patrick Beesly, *Room 40: British Naval Intelligence 1914-1918* (London: Hamish Hamilton Ltd., 1982), p. 254-6

[32] Newbolt, *Naval Operations*, V, p. 283-4

Channel in September, enough at this late stage of the war to account for 34% of the total tonnage destroyed, but this figure represented a mere 22 ships sunk and two damaged, yielding only 27.8% of the total ships sunk for that month. The Flanders bases were evacuated between 17 and 19 October (8) and then overrun during the Hundred Days offensive.[33] The Allies promptly demanded the cessation of the submarine camvpaign as a condition for armistice negotiations,[34] and on 20 October Admiral Scheer ordered the recall of the U-boats still at sea, formally abandoning operations against merchant shipping.[35]





These two charts show the total monthly tonnage, British and Allied (and neutral), and number of merchant ships, fishing craft, and small navy vessels (eg, destroyers, escorts and trawlers), sunk and damaged in the English Channel district areas between February 1917 and October 1918.[36]

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[33] Gibson and Prendergast, *German Submarine War*, p. 324

[34] Scheer, *Germany's High Sea Fleet*, p. 427

[35] Marder, *FDSF*, V, p. 170

[36] Figures derived from <uboat.net> & <wrecksite.eu>. See also: A. J. Tennent, *British Merchant Ships Sunk by U-Boats in World War One* (Cornwall: Periscope Publishing Ltd., 2006), Arno Spindler, *Der Handelskrieg Mit U-Booten,* 5 vols, (Berlin: E. S. Mittler, 1933 - 1966). Special thanks to Dr. Innes McCartney for assistance with these sources.

If this brief summary is compared to the total figures for losses in Home Waters (including the Western Approaches, Arctic and Bay of Biscay, but excluding the Mediterranean), as provided by Henry Newbolt in the Royal Navy's official history, it can be seen that between February and December 1917 the percentage of sinkings in the Channel, relative to the total losses in Home Waters, at first decreased as the submarines focused their efforts outside of the Channel, but then increased dramatically when the introduction of Atlantic convoys restricted the U-boats' activities in that ocean.[37] The heavy sinkings in March (104,038 tons sunk) therefore represented 22.8% of the Home Waters total (249,042 British plus 207,633 Allied and neutral), a figure that climbed in December to 52% of the Home Waters tonnage sunk (120,386 tons in the Channel out of 155,630 British and 76,011 foreign tons).

958,619 tons of British shipping were sunk and damaged in the Channel between February and December 1917, approximately the combined equivalent total losses, in all theatres, of Norway (659,949), Greece (236,070), and Sweden (65,978) that year.[38] France, from the inception of unrestricted submarine warfare in 1917 until the end of the year, suffered 88,649 tons sunk and damaged in the Channel districts, with another 43,343 tons added to that figure during 1918. At 131,922 tons sunk and damaged during the entire unrestricted U-boat campaign, France lost slightly less shipping in the Channel than Norway, at 137,696 tons. These figures together accounted for 52% of the total 517,823 Allied and neutral tons sunk and damaged in the Channel area during the study period.

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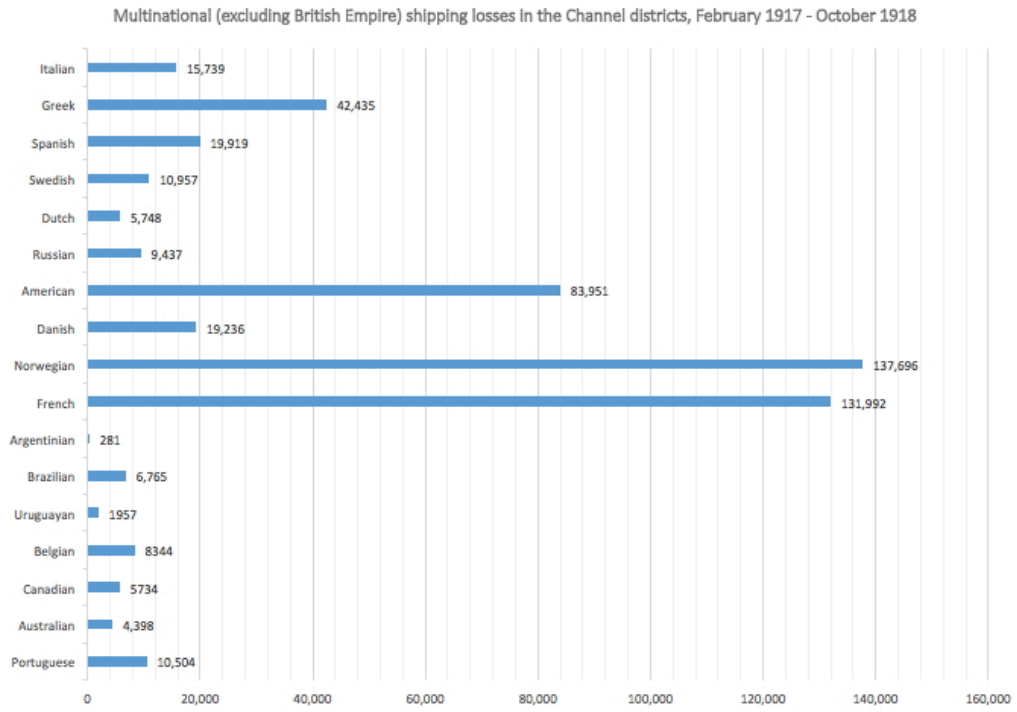
[37] Julian Corbett & Henry Newbolt, *Naval Operations*, 5 vols, reprint (Uckfield: The Naval & Military Press Ltd, 1920-31). See, Newbolt, *Naval Operations*, vol. V, Appendix E

[38] Salter, *Allied Shipping Control*, p. 358

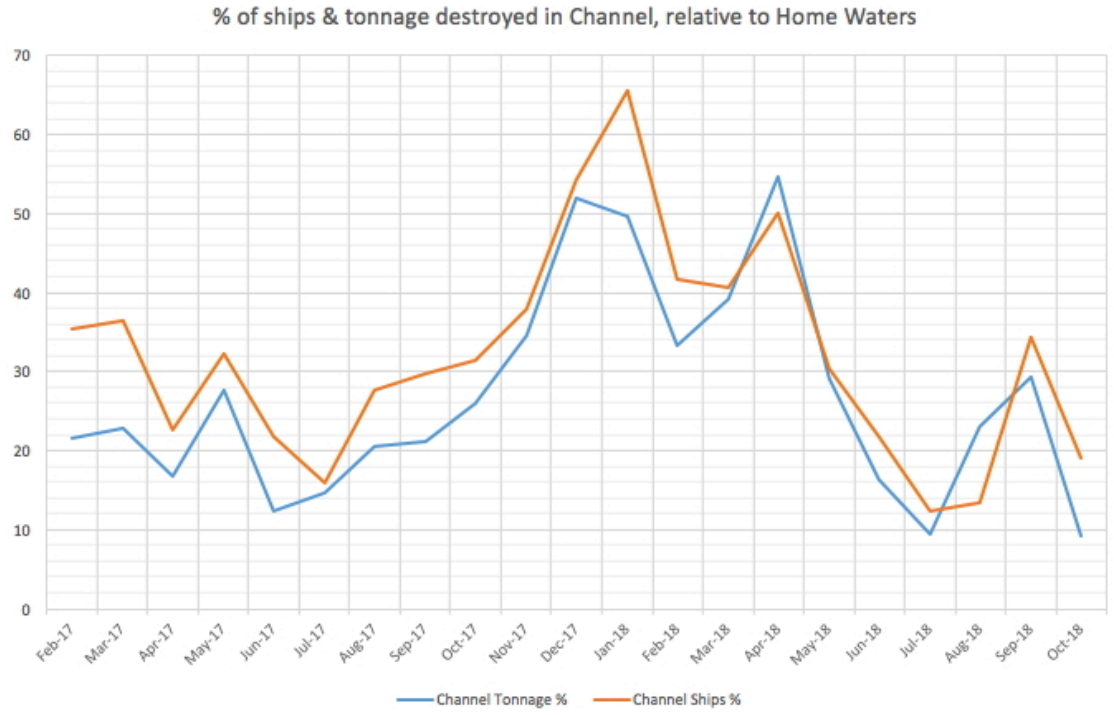


This graph shows the total tonnage sunk and damaged in the Channel district areas for nations other than Britain or the British Empire, between February 1917 and October 1918.

To reinforce the central point, by 1918 the Allied trade defence measures in the Channel proved much more successful, and in February, when the Dover barrage terminally closed the eastern Channel entrance to the U-boats (although the submarines could still navigate along the coasts, at their peril), Channel tonnage losses relative to Home Waters decreased to only 33.4% (81,143 tons combined out of 185,555 British and 57,597 foreign). Although 103,498 tons were sunk in the Channel that April, overall this represented 54.6% of the Home Waters figure, a mixed blessing in that the total U-boat sinkings in other theatres was declining, but also that the Channel had become the most productive theatre for U-boat operations. This brief upswing in sinkings was not sustained, however, as the introduction of coastal convoys thereafter dramatically improved merchant protection and in July only 9.5% of Home Waters tonnage was sunk in the Channel (18,744 out of 133,355 British and 64,734 foreign).[39] Although the U-boats redoubled their efforts, sinking 51,731 tons, 23% of the Home Waters total, in the Channel in

[39] Marder, *FDSF,* V, p. 85

August and another 45,363 tons or 29.3% in September this was in fact the last gasp of the Flanders U-boats.[40]



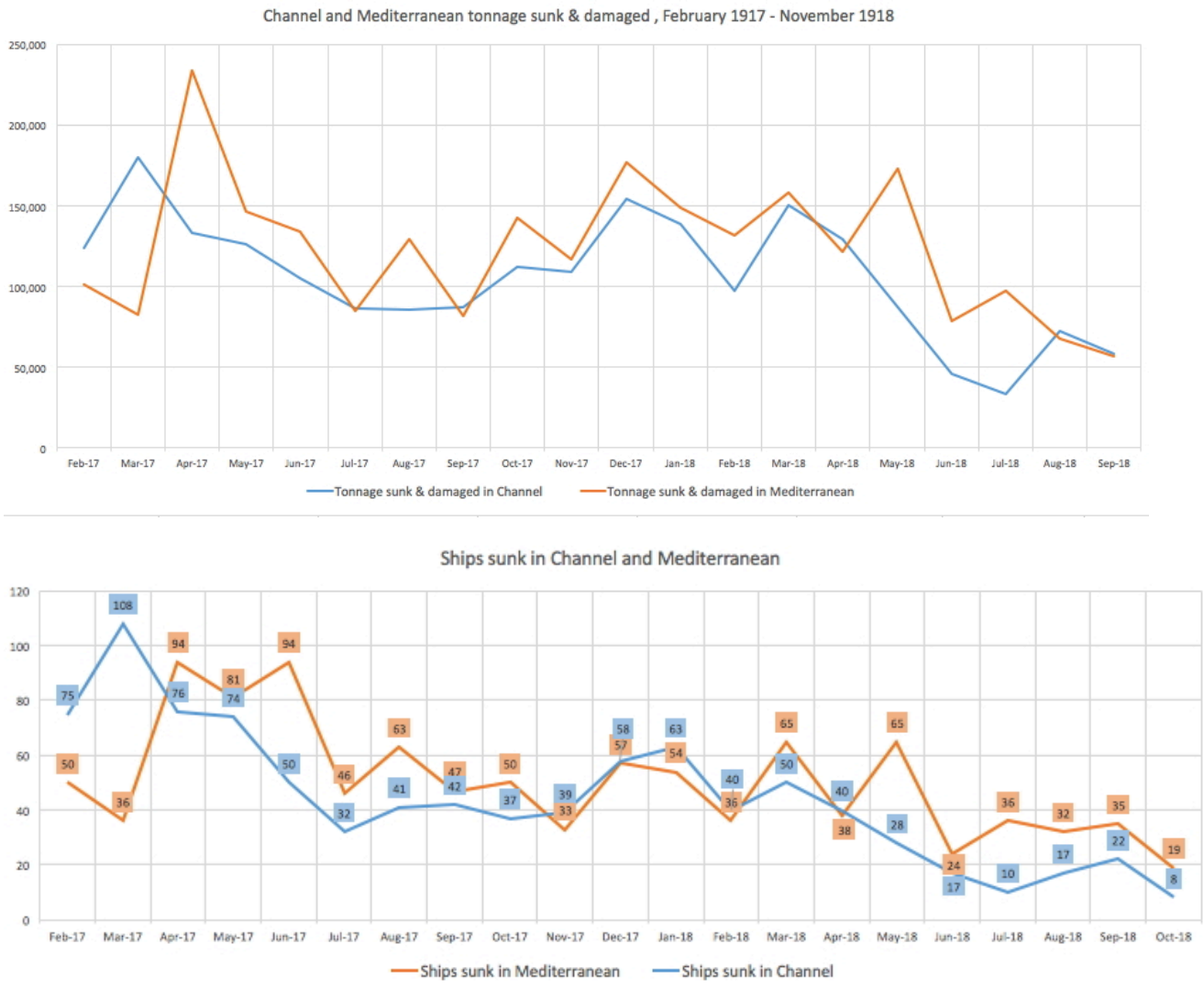
This chart compares the percentages of losses in the Channel to the total Home Waters losses for the period February 1917 – October 1918.

These statistics demonstrate that the Channel was a central battleground in the submarine campaign, indeed at times *the* significant region of the conflict. The importance of the Channel for the submarine campaign, however, is best illustrated by comparing the corresponding figures for the Mediterranean. Between February and December 1917, in that theatre, at least 651 British, Allied and neutral steamers and sailing vessels were sunk (and another 35 damaged), representing 1.43 million tons, or close to a quarter of the total world tonnage destroyed in 1917. This scale of losses is in fact closely comparable to the 1.3 million tons of all nations sunk and damaged in the Channel districts during those same months.[41] The corresponding figures for 1918, between January and September, were 813,000 tons for the Channel districts and 1,032,000 for the Mediterranean. It is notable that during the six months between the beginning of November 1917 and the end of April 1918, 49% of all ships sunk by U-boats were sunk in the

[40] Gibson and Prendergast, *German Submarine War*, p. 328-9

[41] Newbolt, *Naval Operations*, V, Appendix C I, p. 410-2

Channel district areas. It can be seen that the Channel was therefore a vitally important theatre at the end of 1917, and indeed remained comparable to the Mediterranean early in 1918. Although the total rate of successful merchant sinkings declined in the spring of 1918 as new A/S counter-measures and the introduction of coastal convoys dramatically reduced loses, the Channel actually increased in importance as targets in other theatres became scarce.



Monthly tonnage and ships sunk for the English Channel districts and the Mediterranean theatre during the 1917 – 1918 phase of unrestricted submarine warfare.[42]

The statistics point towards the Channel's significance as an operational theatre when compared to the macroeconomic scale of the entire U-boat campaign, but to fully appreciate the

[42] Newbolt, *Naval Operations*, V, Appendix C I, p. 409-11

situation in the Channel itself, it is necessary to increase the resolution beyond the theatre level and examine where shipping losses were actually occurring at the district level. In fact, between the three major Royal Navy Channel districts, most merchant losses nearly always occurred in the Plymouth district, as the ports in that sector were, after all, Britain's primary assembly point for the Atlantic and world shipping routes. The Western Approaches traffic that funnelled into the Plymouth district made this sector the scene of the most furious U-boat activity, and the location where the largest tonnages of shipping was sunk. Interestingly the Plymouth command, despite its importance for the submarine war, has been almost entirely ignored in the historiography with very little written about A/S measures or trade defence in this district.

The second most important district, Portsmouth, varied in significance. Portsmouth was one of the first districts to implement cross-Channel convoys, but was also a fertile source of mine warfare and U-boat concentration once convoys had been implemented in the Atlantic. Although less significant than Plymouth in terms of Britain's global maritime trade, Portsmouth was decisively significant in terms of cross-Channel supply – vital for fueling the French economy and feeding the British Expeditionary Force (BEF).

The Dover district, although undeniably tertiary in terms of merchant sinkings, controlled the Channel's North Sea entrance and was a fortified military region in its own right. Dover was effectively the aero-naval front line, where the Royal Navy fought a combined surface, submarine and air battle over the contested Dover Straits in defence of the variably effective Channel barrage. For this reason, despite the mere handful of merchant losses, has been the subject of the most thorough historiographical study.

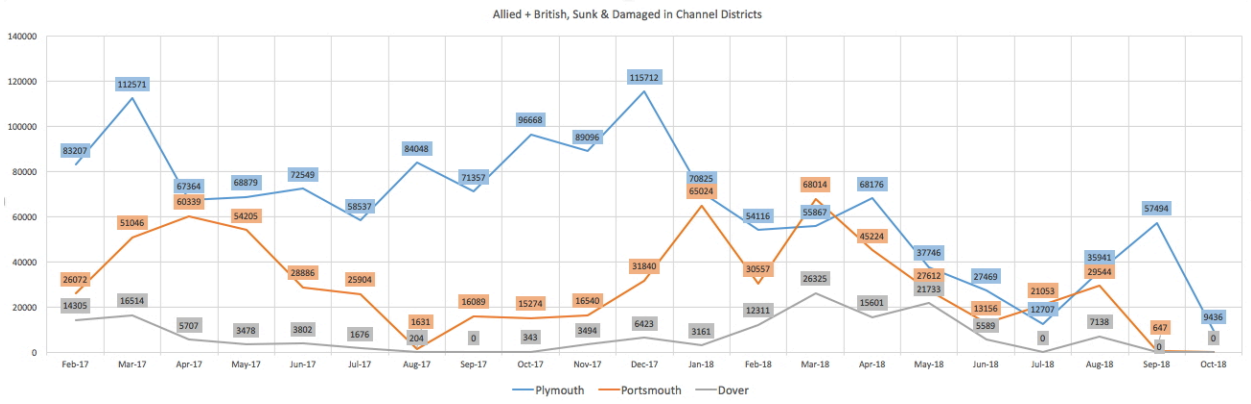


Chart showing the total tonnage figures for ships sunk and damaged, differentiated by the Plymouth, Portsmouth and Dover district areas.

Dover: The Bottleneck

Dover's role in the war is inseparable from its principal commander, Vice Admiral Reginald Bacon, SNO Dover between April 1915 and January 1918.[43] While Bacon was responsible for a number of wartime innovations, his development and maintenance of the Dover barrage remains controversial, concluding with his removal and replacement by Vice Admiral Sir Roger Keyes, who was responsible for the audacious Zeebrugge and Ostend raids.[44] Recent scholarship has emphasized the complex nature of Dover defences, and specialized studies of the Royal Naval Air Service (RNAS) have clarified the essential role of Wing Captain Charles Lambe, whose Dover and Dunkirk based squadrons were responsible for conducting extensive coastal patrols and U-boat base bombing operations.[45]

From the outset of the war Dover was a critical naval district, an area of responsibility that included not only the Channel narrows at the Dover Strait but also operations along the French and Belgian coasts. Rear Admiral Horace Hood, who assumed command of what became known as the Dover Patrol in October 1914, began the effort to secure the straits against German penetration by introducing an outlier indicator net system that by mid-February 1915 constituted some 17 miles of nets overseen by 30 drifters.[46] Construction of the heavy Folkestone to Cape Gris-Nez barrage line commenced next, with French and British destroyers patrolling both coasts, and merchant traffic was restricted.[47] These measures were however only marginally effective as losses in the Channel continued at the rate of two to three merchant ships per week.[48]

Rear Admiral Hood was of a thrusting temperament that better suited him to the Battle Cruiser Fleet (BCF) where he was transferred on 24 May, after briefly commanding the Eleventh

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[43] Reginald Bacon, *The Dover Patrol, 1915-1917*, 2 vols. (New York: George H. Doran Company, 1919)

[44] Cecil Aspinall-Oglander, *Roger Keyes* (London: The Hogarth Press, 1951), p. 222-54; Steve Dunn, *Securing The Narrow Sea: The Dover Patrol, 1914-1918* (Barnsley: Seaforth Publishing, 2017), p. 180-95

[45] John J. Abbatiello, 'British Naval Aviation and the Anti-Submarine Campaign, 1917-1918' (PhD thesis, King's College London, 2004) & Abbatiello, *Anti-Submarine Warfare in World War I: British Naval Aviation and the Defeat of the U-Boats* (New York: Routledge, 2006), & James Goldrick, *After Jutland: The Naval War in North European Waters, June 1916 - November 1918*, Kindle ebook (Barnsley: Seaforth Publishing, 2018)

[46] Corbett, *Naval Operations*, II, p. 271 & Newbolt, *Naval Operations*, IV, p. 331

[47] Fayle, *Seaborne Trade,* II, p. 21-5

[48] Ibid, p. 26

Cruiser Squadron, and was later killed at Jutland in the HMS *Invincible* explosion. Hood's replacement at Dover, and the central protagonist in the Patrol's history, Vice Admiral Bacon, was a career technocrat and underwater warfare specialist who was brought out of retirement and appointed on 12 April as C-in-C Dover.[49] Bacon was ideally suited to the task of expanding defences in the Dover Straits, although his critics have described him as perhaps too great of a centralizer in the Victorian mold, whose tendency to focus on technological minutia may have limited his ability to manage such a dynamic naval battle.[50]

Bacon's appreciation of the Dover Patrol's mission was the following: 1) defend shipping at the Downs anchorage, 2) prevent transit of raiders through the Straits, 3) provide an A/S patrol, and 4) sink U-boats.[51] Upon taking command he reviewed the efforts to block the Channel and determined that Commander Eldridge's attempt to complete a wooden net-boom line was impractical. Bacon abandoned the project in May and refocused efforts on a barrage line between the Goodwin Sands and the French coast.[52] The Folkestone – Cape Gris Nez passage obstructions were replaced by an eastern drifter line that by June was comprised of 132 drifters.[53] Bacon's rationale was that the multiple net lines would protect the Dunkirk and Kent approaches, complementing the net lines established off the Belgian coast. The nets were fitted with explosive mines and smoke emitters meant to detonate on contact, hopefully either destroying or revealing enemy submarines.[54] In practice the nets proved temperamental affairs, not designed by any means to actually *prevent* U-boat transit, while skilled commanders had little difficulty circumventing, or cutting through, the indicator nets without significant risk.[55] Bacon did not consider the submarine a decisive weapon, a position he maintained even after the war, writing in 1919 that 'the stiletto of the submarine, [was] a weapon too weak, too short in reach to inflict

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[49] Messimer, *Find and Destroy*, p. 40. See also, Marder, *FDSF,* II, p. 353fn

[50] R. G. Studd, "'The Dover Patrol 1915-1917' By Admiral Sir Reginald Bacon," *Naval Review Journal* 8, no. 3 (1920): 423–44, p. 424. Arthur Marder, ed., *Portrait of an Admiral, The Life And Papers Of Herbert Richmond.* (Cambridge, MA: Harvard University Press, 1952), p. 260

[51] Studd, "'The Dover Patrol 1915-1917' By Admiral Sir Reginald Bacon.", p. 428

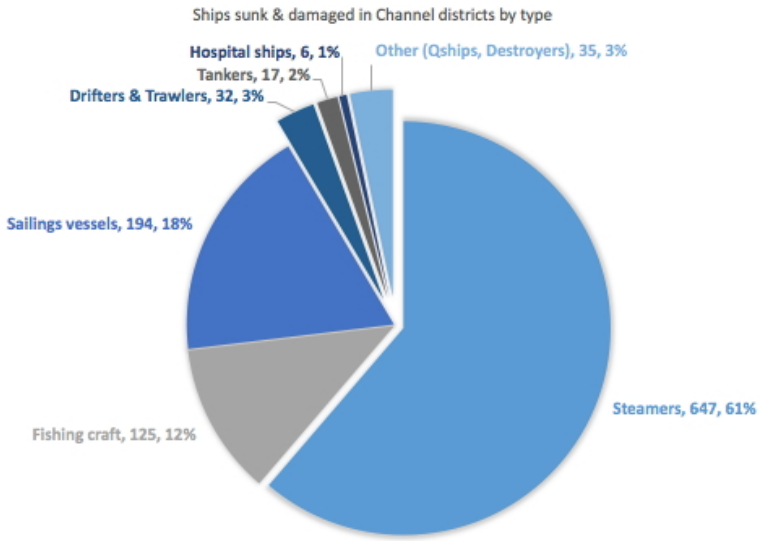
[52] Reginald Bacon, *The Dover Patrol, 1915-1917*, II, 2 vols (New York: George H. Doran Company, 1919), p. 393

[53] Michelsen, *Submarine Warfare*, p. 93. Messimer, *Find and Destroy*., p. 40

[54] Bacon, *Dover Patrol*, II, 1919, p. 394. Messimer, *Find and Destroy*, p. 41-2

[55] Messimer, *Find and Destroy*, p. 43. Marder, *FDSF,* II, p. 353

really vital blows at our sea-borne trade' and with hindsight recommended instead a German strategy based on armed merchant cruisers.[56]



This chart shows the breakdown of ship types for all nations (including the British Empire) sunk and damaged by U-boats in the Channel district between February 1917 and October 1918.

Nevertheless, some A/S successes were obtained by the new methods, such as when *U32* was temporarily caught in a drifter net on 6 April 1915, and more spectacularly when *U8* was destroyed or scuttled in the Channel after a becoming tangled in an indicator net and then subjected to explosive sweep and gunfire on 4 March.[57] On 10 April, as a result of these upsets, the High Sea Fleet command ordered that its submarines were not to attempt the Channel crossing and should instead use the northern route between Scotland and Norway, orders that technically remained in force until December 1916, although the daring High Sea Fleet U-boats, under Kommodore Andreas Michelsen, and the Flanders U-boats, under Korvettenkapitan Karl Bartenbach, continued, nevertheless, to sail down the Channel and in fact no further U-boats were caught in the barrage for the remainder of 1915 or indeed during 1916.[58] The Dover barrage

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[56] Studd, "'The Dover Patrol 1915-1917' By Admiral Sir Reginald Bacon", p. 426. Bacon, *The Dover Patrol,* I, p. 47-9

[57] Dunn, *Securing The Narrow Sea*, p. 31-2. See also, Messimer, *Find and Destroy*, p. 51-2, & Dwight Messimer, *Verschollen: World War I U-Boat Losses* (Annapolis: Naval Institute Press, 2002), p. 21-4

[58] Marder, *FDSF,* II, p. 352, Messimer, *Find and Destroy*, p. 45, Sondhaus, *German Submarine Warfare*, p. 78

remained a veritable sieve during the first six months of 1917, with U-boats successfully transiting the Straits 190 times between December 1916 and June 1917.[59]

Submarines and mines were not the only threat to traffic in the Dover area. Late in 1916 Germany's Flanders destroyers, which had been carrying out sporadic raids during the previous years, conducted a series of raids aimed at probing the barrage defences. The Zeebrugge destroyers raided the Channel on the night of 26 October, an operation that resulted in the destruction of seven drifters and prompted additional destroyers to be detached from the Grand Fleet.[60] Another raid was conducted on the night of 23 November, 25 February, and then again on 20 and 26 April: all limited attacks that provided useful distractions and exposed the weakness of the Dover defences, although, unlike the interdiction raids against the Scandinavian convoys, were of no utility in terms of trade interdiction.[61]

Efforts to improve the Dover barrage were made as the unrestricted submarine crisis worsened during the spring of 1917. The year began with the Allies successfully reverse-engineering the effective German mine (Type H, or 'horned' mine),[62] and production numbers increased significantly. Although by October only 1,500 had been manufactured mass production was thereafter introduced and 12,450 mines were produced between October and December, with 10,389 laid in the Dover Strait and Heligoland Bight.[63] The new mines allowed for the Folkestone to Cape Gris-Nez barrage to be replaced and strengthened, such that by December 1917 a 'mine wall' ten rows deep, containing 4,000 mines and covered by powerful surface illumination had been installed.[64]

The improvements to the Channel defences were partly the result of the November 1917 Channel Barrage Committee, of which the chairman was Rear Admiral Roger Keyes, formerly

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[59] The annoyance of the barrage line prompted retaliation and, in June and July 1915, newly commissioned short range UC-type minelaying boats began placing minefields near the Dover harbour and off the Thames estuary. Dunn, *Securing The Narrow Sea*, p. 87-8, 130

[60] Hurd, *The Merchant Navy*, II, p. 283-5

[61] Goldrick, *After Jutland*, chapter 9, loc. 3036-45, 3209-55. Newbolt, *Naval Operations,* IV, p. 373. Dunn, *Securing The Narrow Sea*, p. 135-41. See also, Hurd, *The Merchant Navy*, III, p. 42 et seq

[62] Jellicoe to Beatty, 2 April 1917, #39 in A. Temple Patterson, ed., *The Jellicoe Papers, 1916-1935*, II, 2 vols. (London: Spottiswoode, Ballantyne and Co. Ltd., 1968), p. 154-5

[63] Michelsen, *Submarine Warfare*, p. 94 & John Jellicoe, *The Submarine Peril* (London: Cassell & Co. Ltd., 1934), p. 13

[64] Michelsen, *Submarine Warfare*, p. 94

the Director of the Plans Division of the Naval Staff.[65] Both Bacon and Keyes had endorsed the deep minefields, to be deployed between Gris Nez and the Varne.[66] The Committee report, which was circulated on 29 November, pointed to papers and testimony from the crews of *U48* (ran aground on the Goodwin Sands and was scuttled on 24 November),[67] and *UC65* (torpedoed by *C15* on 3 November off Beachy Head),[68] in addition to intelligence from Room 40,[69] that collectively demonstrated the inadequacy of the existing Channel defences.[70] Bacon promised reform but it was clear that he objected to the Admiralty dictating his deployments.[71] Nevertheless, at an Admiralty meeting on 18 December, Bacon was pressured into implementing an illuminated flare patrol along the Folkestone – Gris Nez deep line, the success of which was dramatically demonstrated the following day when *UB56* dived into the barrage and was destroyed.[72] On New Years Day 1918 Keyes replaced Bacon as C-in-C Dover. Keyes believed it was his singular mission to stop the U-boat activity in the Channel, and with renewed energy he tackled the Dover barrage.[73]

The deep mine wall proved much more effective: six U-boats were considered to have been destroyed by barrage mines between September and the end of the year,[74] another four boats were mined in the Channel between 19 December 1917 and 8 February 1918, and *UB35* was depth-charged by HMS *Leven*. A total of 12 enemy submarines were destroyed between November 1917 and May 1918.[75] Maritime archaeology and underwater survey have recently verified that of the 35 U-boats destroyed in the English Channel and approaches, 16 were in fact destroyed by mines.[76] After the war Bacon claimed he had been a motive force behind the new

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[65] Newbolt, *Naval Operations*, V, p. 178-9

[66] Ibid, p. 180

[67] Messimer, *Verschollen*, p. 69

[68] Ibid, p. 304

[69] Dunn, *Securing The Narrow Sea*, p. 156

[70] Newbolt, *Naval Operations,* V, p. 181

[71] Ibid, p. 182-3

[72] Dunn, *Securing The Narrow Sea*, p. 158. Newbolt, *Naval Operations*, V, p. 183. See also, Messimer, *Verschollen*, p. 177

[73] Dunn, *Securing The Narrow Sea*, p. 157

[74] Marder, *FDSF*, IV, p. 226

[75] D. W. Waters and Frederick Barley, *The Defeat of the Enemy Attack on Shipping, 1939-1945*, ed. Eric Grove (Aldershot: Ashgate, 1997), p. 13

[76] McCartney, "The Archaeology of First World War U-Boat Losses", p. 191

barrage, however, Lieutenant-Commander R. G. Studd, a Lieutenant aboard the Dover Patrol monitor *General Wolfe* from September 1915 until the end of the war,[77] in a critical review of Bacon's book for the *Naval Review*, demonstrated that Bacon's conceptualization of the barrage differed entirely from the measures adopted after his dismissal.[78] The post-Bacon system, besides the deep minefields, included 1) night and day surface patrol, 2) maximum illumination by flares and searchlights, 3) monitors and patrol craft deployed to protect the drifter lines, 4) destroyers patrolling between Calais and the Goodwins.[79] U-boat commanders willing to accept the risks could still penetrate through these formidable defences, and during January 1918 eight cruiser-type boats and 15 UB and UC-types utilized the Channel crossing.[80] In view of the increased risk of destruction, however, Commodore Michelsen, responsible for the High Sea Fleet's U-boats, could no longer advocate the use of the Channel route, instead mandating the northern route around Scotland (which was itself being steadily mined in the form of the Northern Barrage),[81] effectively adding five days of transit to the U-boats' cruise.[82]

The battle in the Dover Strait was not limited to destroyer and submarine action. Of the three Channel commands, only Dover (and its attached Dunkirk base on the continent) had to contend with enemy air raids. In 1914 a mere 22 lbs of bombs were dropped on Dover and Channel coast, but in 1916 this figure increased to 3,784 lbs (1.7 tons, 172 bombs) before reaching the wartime peak of 75,517 lbs (at least 33.7 tons, approximately 620 bombs) in 1917, a bombing effort that concluded with nine 660 lb bombs dropped from Zeppelin-Staaken 'Giant' bombers in 1918.[83] For comparison, 1,824 bombs weighing 66 tons were dropped on London during the war.[84] The RNAS and its RAF successor fought back, and by June 1918 RAF

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[77] Service record of Ronald Granville Studd, TNA ADM 196/144/500

[78] Studd, "'The Dover Patrol 1915-1917' By Admiral Sir Reginald Bacon," p. 440

[79] Ibid

[80] Newbolt, *Naval Operations,* V, p. 209

[81] Marder, *FDSF,* V, p. 66-75

[82] Ibid., p. 41-2

[83] Statistics compiled from Christopher Cole and E. F. Cheesman, *The Air Defence of Britain 1914-1918* (London: The Bodley Head Ltd, 1984), Jonathan Sutherland and Diane Canwell, *Battle of Britain 1917: The First Heavy Bomber Raids on England*, Kindle ebook (Barnsley: Pen & Sword Aviation, 2006), Appendix II. See also, Raymond Fredette, *The First Battle of Britain, 1917-1918* (London: Cassell and Company, Ltd, 1966), & Joseph Morris, *German Air Raids on Britain 1914-1918* (Dallington, East Sussex: The Naval & Military Press Ltd, 1993), Appendix I & II

[84] H. A. Jones, *The War in the Air,* [hereafter, *WIA*], *Appendices*, 6 vols, reprint (London: The Naval & Military Press Ltd, 1922-37), Appendix XLIV, p. 164

Brigadier-General Charles Lambe's No. 5 Group (Dover and Dunkirk, the latter soon replaced by the US Navy's Northern Bombing Group),[85] was dropping 60 tons of bombs on the Flanders U-boat bases at Bruges and Zeebrugge every two weeks.[86] For the First World War these were impressive figures, although ultimately not comparable to the 2,284 tons of bombs dropped on the five U-boat bases in France in 1942, let alone the 11,198 tons dropped in 1943.[87]

With the Flanders bases under serious air bombardment and the Dover Strait defended by its mine wall and surface destroyers, merchant traffic in the Dover area was well protected from enemy attack. The percentage of Channel shipping sunk or damaged in the Dover district during the 21 complete months of the unrestricted campaign averaged only about 6.3%. Peak sinkings in the Dover district occurred under Keyes' tenure, during the period March, April, May 1918 before the introduction of coastal convoys, when one or two U-boats operating in the confined eastern Channel waters managed to destroy or damage 63,700 tons of shipping in the Dover district. Between 28 and 30 April *UB5 ,* commanded by the reckless Oberleutnant zur See Johannes Lohs – 'Go through the barriers on the surface… The patrols are blind. I go through under their noses',[88] alone sank five ships collectively worth 14,000 tons. In May *UB57* and *UC71* sunk and damaged another five ships, totally 21,700 tons, representing a quarter of all losses in the Channel districts that month. Although Lohs continued to harass Dover district shipping over the following months, including sinking the 7,138 ton *City of Brisbane* near Newhaven on 13 August, he and his crew were killed when they drove into a mine off the coast of Zeebrugge while attempting to return to base the following day.[89] Likewise, Oberleutnant zur See Hans Kukenthal damaged the 5,275 ton *Tuscan Prince* in the Dover district on 5 August, before being detected by destroyer HMS *Opossum*'s hydrophone hunting group of six motor launches and depth-charged to destruction over three days, the hunters finally hitting their mark

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[85] Geoffrey Rossano and Thomas Wildenberg, *Striking the Hornets' Nest* (Annapolis: Naval Institute Press, 2015), p. 181 et eq

[86] Abbatiello, *Anti-Submarine Warfare*, p. 75

[87] Waters and Barley, *Defeat of the Enemy Attack on Shipping*, table 24

[88] Gibson and Prendergast, *German Submarine War*, p. 318

[89] Messimer, *Verschollen*, p. 178, Tomas Termote, *Krieg Unter Wasser: Unterseebootflotille Flandern, 1915-1918*, Kindle ebook (Hamburg: E. S. Mittler & Sohn, 2015), UB-Boote, loc. 5328-82

on 10 August.[90] *UB109*, which had been patrolling in the Plymouth district, was also destroyed in the Dover district that August, driving into a mine of the 29th as the boat attempted to pass through the Folkestone minefields.[91] These examples demonstrated that although it was still possible to penetrate the Dover Barrage, by utilizing the coasts, the danger to the submarines was grave.

Bacon and Keyes had attempted to counter the U-boats with their own forms of offensives, Bacon through bombardment of the U-boat bases with monitors, and Keyes through deep minefields and aggressive aerial bombing and blockship operations as attempted in the Zeebrugge (23 April) and Ostend (9 May) raids. Dover, at the front-lines of a naval, submarine and air battle, required a careful balance of countermeasures to protect shipping, and if Bacon's response to the U-boat threat during 1917 had been hesitant, the concern over aerial and surface threats was real. Technical improvements in mine warfare, and methodological reforms introduced by the Naval Staff, decisively closed the Straits by the summer of 1918.[92]

Portsmouth: The Lifeline

The Portsmouth district was the main departure point for the cross-Channel trade that kept the BEF supplied in France and the French economy functioning while its coalfields were under enemy occupation. Since 1912 Portsmouth had been under the command of Admiral Sir Hedworth Meux, who oversaw a constant stream of transports departing England for the continent as the BEF ballooned in size and the Western Front swallowed up men and munitions.[93] Admiral Meux's forces were concentrated at Southampton, base of the Portsmouth Extended Defence area, by January 1915 built up to include 14 destroyers (six old, eight *Beagle* class), 11 minesweepers, 17 TBs, 17 armed trawlers and 83 net drifters.[94]

Admiralty policy for Portsmouth, resulting from the initial German 'War Zone' declaration of February 1915, was that troopships should cross the Channel to Le Havre only when escorted, preferably at night, unless the transports were fast enough to steam

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[90] Messimer, *Verschollen*, p. 288-9, Termote, *Krieg Unter Wasser*, UC-Boote, loc. 6545. Innes McCartney, "The Maritime Archaeology of a Modern Conflict: Comparing the Archaeology of German Submarine Wrecks to the Historical Text, Volume One" (PhD thesis, Bournemouth University, 2013), p. 134

[91] Messimer, *Verschollen*, p. 220

[92] Letter from Jellicoe to Sims, 6 October 1919, #125 in Temple Patterson, *Jellicoe Papers,* II, p. 395-6

[93] Corbett, *Naval Operations*, I, p. 73-5

[94] Corbett, *Naval Operations*, II, p. 133-4

independently, although even this allowance was soon modified to require escort.[95] The C-in-C Portsmouth was thus in command of one of the first organized escort systems implemented by the Royal Navy outside of the Grand Fleet. In February 1916 Admiral Meux departed for Westminster, after winning the unopposed by-election for MP Portsmouth where he replaced Admiral Charles Beresford who had been elevated to the peerage.[96] Meux's successor at Portsmouth was Admiral Sir Stanley Colville, formerly the C-in-C Orkneys.[97]

During Colville's tenure the Portsmouth command's trade protection role was expanded beyond issuing route procedures and providing troopships with escort to fully protected sailings starting in February 1917 for the cross-Channel coal trade.[98] This was a highly successful example of grass-roots convoy organization that, along with the Scandinavian ore trade (organized and convoyed by the C-in-C Orkneys and C-in-C Rosyth), and the Dutch beef trade (convoyed and organized by Commodore Tyrwhitt of the Harwich Force late in 1916), is often cited as one of the key examples that convinced the Admiralty of the viability of Atlantic convoys in 1917.[99] The French coal trade was divided into four protected routes, across which during the war 37,927 coal transport voyages were convoyed with the loss of only 53 ships.[100]

Route A, between Penzance and Brest, over which there were 10,204 sailings with only 39 losses from inception to the end of the war, was controlled by the SNO Falmouth, after April 1917 Rear Admiral John Luard, and the Prefet Maritime Brest, from March to November Vice Admiral Pierre Ange Marie Le Bris and then Vice Admiral Frederic Paul Moreau.[101] Route B, between Portland and Cherbourg, with 7,355 sailings and three losses, was controlled by the SNO Portland, Rear Admiral Richard Harbord until November, and then Rear Admiral Vivian Bernard, and the Prefet Maritime Cherbourg, Vice Admiral Antoine-Auguste Tracou until

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[95] Ibid, p. 273-4

[96] V. W. Baddeley and Roger T. Stearn, "Meux [Formerly Lambton], Sir Hedworth (1856-1929)," in *The Oxford Dictionary of National Biography* (Oxford University Press, 2008) & John Bullen, 'Colville, Sir Stanley Cecil James (1861-1939),' in *The Oxford Dictionary of National Biography* (Oxford University Press, 2004)

[97] *The Naval Who's Who, 1917* (Polstead: J. B. Hayward & Son, 1981), p. 40, 106

[98] Marder, *FDSF,* IV, p. 138-9

[99] Waters & Barley, *Defeat of the Enemy Attack on Shipping*, p. 7, 40. See also, John Jellicoe, *The Crisis of the Naval War* (London: Cassell and Company, Ltd, 1920), p. 48

[100] Marder, *FDSF,* IV, p. 139

[101] <https://actu.fr/bretagne/brest_29019/histoire-frederic-paul-moreau-1858-1929-prefet-maritime-brest_8600000.html> & <http://ecole.nav.traditions.free.fr/officiers_lebris_pierre.htm> accessed 16 April 2020. See also, Auguste Thomazi, *La Marine Francaise Pendant La Grande Guerre (1914-1918)*, I, 5 vols. (Paris: Payot, 1925). Service record of John Scott Luard, TNA ADM 196/42/350

November and then Vice Admiral Louis Jaures.[102] Close to the Channel Islands, Route C, between St. Helens or Weymouth and Havre, was controlled by the C-in-C Portsmouth, Admiral Colville, and the French SNO at Havre, since February Port Admiral and Major-General Charles Baron Didelot, who was assisted by a number of Royal Navy transport officers as arranged at the end of 1915, much like the agreement late in 1914 regarding French responsibility in the western Channel (see map).[103] The Portsmouth district protected route, with 14,754 sailings and 12 losses, included traffic between Southampton and Havre which was the main line of supply for the BEF that, significantly, had been escorted by both Royal Navy and Marine National destroyers since 1914.[104] Route D, with 6,757 sailings and zero losses, between Southend or Dover and Boulogne (SNO Captain William Benwell), plus Calais, was controlled by the VA Dover Patrol, Vice Admiral Bacon until his replacement by Vice Admiral Keyes at the beginning of 1918.[105] The French naval forces at Dunkirk were initially under the command of Rear Admiral de Marliave, until he was replaced in May 1916 by Vice Admiral Pierre Ronarc'h, who commanded at Dunkirk and worked closely with Vice Admiral Bacon.[106]

The statistics summarized above demonstrate how highly successful this prototypical convoy system was, organized between the Royal Navy and Marine National Channel SNOs, and by Captain Reginald G. H. Henderson, a member of the Anti-Submarine Division (ASD) of the Royal Navy's Staff, an influential proponent of Atlantic convoys and after the war the commander of HMS *Furious* and then Third Sea Lord from 1934 until his death in 1939.[107] The cross-Channel convoys were provided with trawler escort from the Auxiliary Patrol: zones XIV (Falmouth and Plymouth), XIII (Portland), XII (Isle of Wight) and XI (Dover) representing the

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[102] Jean Moulin, "France: La Marine Nationale," in *To Crown the Waves: The Great Navies of the First World War*, ed. Vincent P. O'Hara, W. David Dickson, and Richard Worth (Annapolis: Naval Institute Press, 2013), chapter 2. <https://www.naval-history.net/xGW-FrenchNavyWW1Admirals.htm> accessed 16 April 2020, Service record of Richard Morden Harbord-Hamond, TNA ADM 196/42/332 & Service record of Vivian Henry Gerald Bernard, TNA ADM 196/43/15

[103] <http://dreadnoughtproject.org/tfs/index.php/Le_Havre> accessed 16 April 2020, Bacon, *Dover Patrol*, II, 1919, p. 443

[104] Anthony Clayton, *Three Republics One Navy: A Naval History of France, 1870-1999*, Kindle ebook (Solihull, West Midlands: Helion & Company, 2014)., chapter 5, loc. 1084

[105] Newbolt, *Naval Operations*, V, Appendix B III. Jellicoe, *Crisis of the Naval War*, p. 94-5, Service record of William Francis Benwell, TNA ADM 196/43/214

[106] Bacon, *Dover Patrol*, II, 1919, p. 443-5

[107] Jellicoe, *Crisis of the Naval War*, p. 95. Fayle, *Seaborne Trade*, III, p. 100. See also, Nicholas Black, *The British Naval Staff In The First World War* (Rochester: Boydell & Brewer Inc., 2011), p. 182-4

key Channel trawler bases. Each trawler base included several trawler groups, each group composed of six trawlers and a yacht, at least one vessel of which was equipped with W/T - and supplemented with airship and aircraft escort during the day.[108] Furthermore the Channel convoys were supported by hydrophone equipped flotillas, of which there were four motor launch patrols (six vessels each) established for submarine hunting at Dartmouth, Portland, Portsmouth, and Newhaven.[109] An additional group of six British trawlers, four minesweepers and 26 net drifters operated out of Trouville to cover the approach to Le Havre.[110] In October 1917 the first shore-based Channel hydrophone station was opened at Cuckmere Haven near Eastbourne, followed in 1918 by stations outside Plymouth at Rame Head (January), on the Isle of Wight at Freshwater (March), at Lulworth (May), and at Margate (August).[111]

The Admiralty, in co-operation with the French, was steadily exerting control over all Channel trade. Fishing vessels, initially easy targets (675 British fishing craft totalling 71,765 tons were sunk in all theatres during the war),[112] were also organized into groups. Each group comprised a dozen vessels, several of which were armed, and at least one equipped with W/T, the same scheme used for merchant convoys.[113] The militarization of the merchant seafarers and fishermen required expanded training facilities. Commander E. L. B. Lockyer, working under Captain Webb of the Trade Division, proposed war-time standards that would prepare the merchant crews for convoy duty, including lighting discipline and submarine observation training.[114] In February 1917, based on the success of the volunteer 'submarine menace course' available at Chatham and Cardiff, HMS *Excellent* at Portsmouth was selected to train officers and masters. The course was expanded to include Devonport and, on 14 May 1918, made mandatory for 'masters and chief officers of British merchant ships of 1,600 tons gross and above'. At Portsmouth 207 masters and 1,267 officers took the volunteer course, while 396 masters and 477 officers attended the compulsory course. The figures for Devonport were 455

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[108] Faulkner and Lambert, *The Great War At Sea, A Naval Atlas, 1914 - 1919*, p. 119-20

[109] Hurd, *The Merchant Navy*, III, chapter 2, et seq

[110] Hurd, *The Merchant Navy*, II, p. 288

[111] Willem Hackmann, *Seek & Strike: Sonar, Anti-Submarine Warfare and the Royal Navy, 1914-54* (London: Her Majesty's Stationery Office, 1984), p. 65-6

[112] Hurd, *The Merchant Navy*, III, Appendix C

[113] Richard Webb, 'Trade Defence in War,' *Royal United Services Institution Journal* 70, no. 477 (1925): 31–55, p. 34. Black, *British Naval Staff*, p. 186

[114] Jellicoe, *Crisis of the Naval War*, p. 81

masters and 548 officers. All told this training scheme graduated 4,620 masters and 5,606 officers during the war, one of the lesser known achievements of the Royal Navy's trade defence system.[115]

Furthermore the district was well supported from the air: Portsmouth's RNAS contingent was under the command of the Channel Group CO, Wing Commander A. W. Bigsworth. Bigsworth, who had formerly been a pioneering Squadron Commander stationed at Dunkirk,[116] was supported by the former Director Air Services (DAS), Rear Admiral Charles L. Vaughan-Lee, who himself had been appointed the Admiral Superintendent of the Portsmouth Dockyard in January 1917.[117]

Bigsworth's forces were significantly expanded as 1917 progressed, with new stations opened at Portland and Bembridge, followed by additional bases at Newhaven (11 May), Cherbourg (26 July), and the Polegate airship station was transferred from Wing Captain Charles Lambe at Dover to Bigsworth's command (23 July). Lastly, a kite-balloon station, crucial for providing day and night reconnaissance over convoys, was opened at Tipnor on 28 September.[118] Commander Jean de Laborde, who at the beginning of the war had been in charge of the centre d'aviation maritime (CAM) Dunkirk, and was now chief of the French Naval Aviation Service, attended a conference at the Admiralty on 11 May in which British and French air patrol zones were arranged and common W/T signals organized.[119]

The French aviation patrol system was divided into three districts, the first responsible for North Sea and Dunkirk region, the second for the English Channel and Atlantic approaches, and third for the Mediterranean. It is the first and second districts that interests us here. The first district was divided into two zones, with 32 seaplanes at Dunkirk and Saint-Pol commanded by Lt de vaisseau Lofevre, and 22 seaplanes at Boulogne and Dieppe commanded by Lts de vaisseau Serre. The Atlantic and Channel district was composed of three divisions, representing Normandy, Brittany and Gascony, of which the first was responsible for the Channel and the second and third for the Atlantic approaches. The Normandy division included La Havre,

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[115] Hurd, *The Merchant Navy*, 1929, III, chapter 5, p. 135-63

[116] Alexander L. N. Howlett, "The Royal Naval Air Service and the Evolution of Naval Aviation in Britain, 1914 - 1918" (PhD thesis, King's College London, 2019), p. 124, 194. David Hobbs, *The Royal Navy's Air Service in the Great War* (Barnsley: Seaforth Publishing, 2017), p. 116

[117] Portsmouth General Orders, 7 January 1917, The National Archives, Kew [hereafter, TNA] ADM 179/78

[118] Jones, *WIA*, IV, p. 48

[119] Newbolt, *Naval Operations*, V, p. 35-6

commanded by Lt de vaisseau Flamanc with 16 flying boats, Cherbourg, with 24 aircraft, and Capitaine Lafay at Lion-sur-Mer with 12.[120] Later in 1917 a French seaplane base was established at Castle Cornet, Guernsey, erected after the location was scouted by Lt de vaisseau Pierre Le Cour-Grandmaison during the summer of 1917 and in August a team of Royal Engineers began construction of the base which was operational in September with 12 flying boats.[121] The Guernsey flying boats attacked and damaged U-boats on 31 January, 23 April, 6 May, and 31 May 1918.[122]

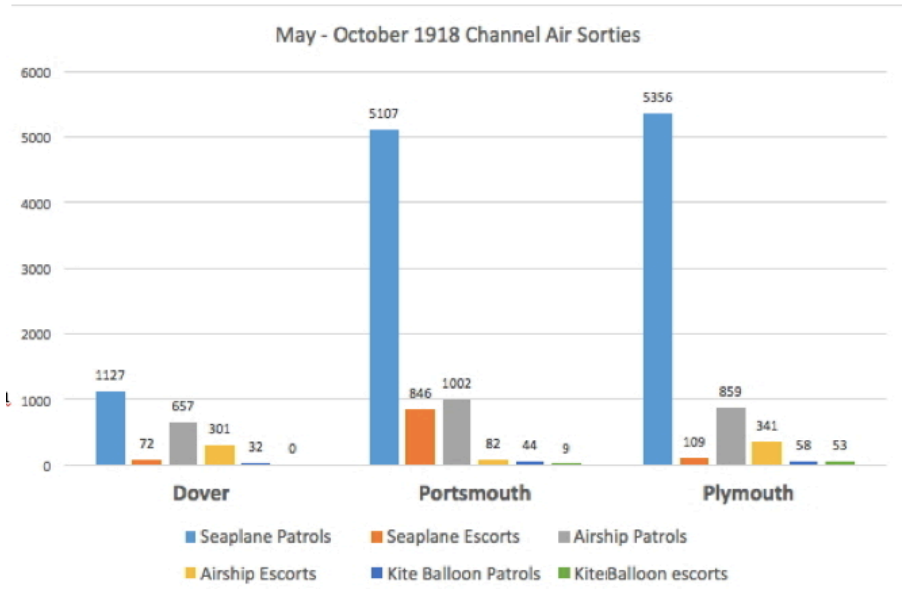

Chart showing air escort and patrol missions flown in the district areas, May to October 1918.[123]

Combined with the RNAS bases in Wing Captain Gerrard's South West Group (see below), and the other French flying boat bases in the Channel, this overlapping and coordinated seaplane and airship patrol system provided a daytime patrol and escort capability that severely restricted the U-boats' freedom of operation, although the submarines were still able to surface at night – when they could recharge their batteries unmolested. During 1917 the Channel Group

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[120] Terry Treadwell, *The First Naval Air War* (Stroud: The History Press, Ltd, 2010), p. 113

[121] <http://ecole.nav.traditions.free.fr/officiers_lecour.htm>, accessed 5 April 2020. Terry Treadwell, *The First Naval Air War* (Stroud: The History Press, Ltd, 2010).. See also, Raoul Lempriere, *History of The Channel Islands* (London: Robert Hale & Company, 1974), p. 211

[122] Treadwell, *The First Naval Air War*, p. 114. English Channel, German Submarines, May 1918, TNA ADM 137/1479

[123] Abbatiello, *Anti-Submarine Warfare*, p. 126-7

flew 1,540 patrols, in addition to 406 Sea Scout and Coastal-type airship sorties.[124] This air coverage provided the Portsmouth zone with an unprecedented degree of protection and between March and May 1917 there were only nine ships lost sailing with convoys, all at night, out of the 4,000 ships convoyed, and between May and August the figure was 8,825 vessels convoyed with only 14 losses.[125] Even independent merchant ships began to join the convoys, *defacto* recognition of the success of the protected sailings.[126]

Despite this comprehensive scheme of sea and air escorts, losses of vessels traveling outside of the convoy system in the Portsmouth district remained at a rate averaging 28% of all Channel losses during the 1917-1918 crisis. The periods of greatest losses were January and March 1918, when 65,000 and 68,000 tons were sunk, respectively. Although the absolute tonnage lost in the Portsmouth district fell after the spring of 1918 when coastal convoys were implemented, the overall *percentage* of losses in the district remained high as losses elsewhere tapered off. The significant decrease in U-boat activity after the introduction of coastal convoys is demonstrated by the statistics for July when 62% of all Channel tonnage sunk and damaged took place in the Portsmouth district.

This dramatic percentage however represented only 21,053 tons. Once again this included the work of Johannes Lohs and his *UB57* crew, who sank the 5,306 ton British steamer *Shirala* on 2 July and damaged two more steamers worth a collective 8,971 tons over the next four days. *UB103* (one 731 ton steamer sunk) and *UB88* (damaged a 6,045 ton steamer) were also active around Portsmouth that month. On 9 August *UB57* sunk the *Glenlee* for another 4,915 tons, while Oberleutnant zur See Walter Warzecha in *UC71* damaged two steamers worth a combined 12,826 tons, and the less lucky Hans Kukenthal in *UC49* sank the 7,713 ton *Warilda* on 3 August. As these cases indicate, the Flanders U-boats could still inflict a few notable wounds, although at great risk to their safety: less than fortnight after these attacks both Lohs and Kukenthal had been killed.

Plymouth: The Linchpin

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[124] Wing Commander A. W. Bigsworth, RNAS Portsmouth Group, General Report of Work Carried out during year 1917, 2 December 1917, TNA AIR 1/659/17/122/609

[125] Waters & Barley, *Defeat of the Enemy Attack on Shipping*, p. 7. Jellicoe, *Crisis of the Naval War*, p. 96

[126] Black, *British Naval Staff*, p.177

The Plymouth command gradually increased in significance as the U-boats were forced to extend their area of operations into the Atlantic and away from the coasts. The Plymouth district, commanded from the HQ at Devonport, was part of a broader group of districts known as the South West Approaches that included the base at Falmouth on the Cornwall peninsula, Vice Admiral Lewis Bayly's Ireland command at Queenstown which was supplemented in the summer and fall of 1917 by USN forces organized energetically by Admiral William Sims, including destroyers and flying boats, the latter under the command of Captain Hutch Cone,[127] and lastly the Bristol Channel approach that funneled shipping into Milford Haven. At the beginning of 1917 the Plymouth district itself, running along the coast from Trevose Head to Portland Bill, the main terminus for Western Approaches shipping.[128] The C-in-C Plymouth was responsible for the largest area of operations in the Channel districts and, unlike Dover or Portsmouth, his command involved protecting traffic from North and South America, Africa, and the Mediterranean.

The established system of trade defence at this time was based on 'approach routes', originally organised in July 1916.[129] This system provided for four approach 'cones' which were swept by patrol ships so as to keep the routes clear of enemy raiders.[130] The randomness of the system might usefully confuse surface raiders but was ultimately to prove disastrous as it funneled shipping into dangerously crowded and exposed lanes. A great number of destroyers and patrol craft were needed to sweep the vast approach areas, and it was unlikely that patrol ships alone would encounter U-boat not wanting to be found. As Henry Jones phrased it, the approach-lane system had the effect of 'concentrating great numbers of [merchant] ships along the patrol routes off the south coast of Ireland and in the Bristol Channel' where they were easy prey for waiting submarines.[131]

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[127] William N. Still, *Crisis at Sea: The United States Navy in European Waters in World War I* (Gainesville: University Press of Florida, 2006), p. 91-110, 446, Geoffrey L. Rossano, *Stalking the U-Boat, U.S. Naval Aviation in Europe during World War I* (Gainesville: University Press of Florida, 2010), p. 208 et seq, Sims, *The Victory at Sea*, p. 118-22, 320

[128] TK

[129] Webb, "Trade Defence in War", p. 38. See also, Seligmann, *The Royal Navy and the German Threat, 1901-1914*, p. 110

[130] Norman Leslie, "The System of Convoys for Merchant Shipping in 1917 and 1918," *Naval Review* 5, no. 1 (1917): 42–95, p. 43

[131] Jones, *WIA,* IV, p. 45. Interestingly, this had been essentially Admiral Sir Arthur Wilson's prediction regarding the scheme when it had been discussed in 1905: see, Seligmann, *The Royal Navy and the German Threat*, p. 111

The Plymouth district was initially under the command of Admiral George Le C. Egerton, although he was superseded in 1916 by Vice Admiral Sir George J. S. Warrender. On 27 November Jellicoe, who was shortly to take charge of the Admiralty as First Sea Lord in David Lloyd George's coalition government, invited Rear Admiral Alexander Duff, second in command of the 4th Battle Squadron, to head up the new Anti-Submarine Division (ASD) of the Naval Staff.[132] The ASD was formally constituted on 18 December, with Captain F. C. Dreyer as Duff's Assistant Director.[133] Two days after Jellicoe's promotion to First Sea Lord on 7 December, Rear Admiral Alexander Bethell, an experienced blockade theorist with Naval War College connections, and formerly the Director of Naval Intelligence, was instructed to replace Warrender, who suffered from deafness and who Jellicoe, as a result of Warrender's performance during the 16 December 1914 Scarborough raid, believed was 'absent-minded', as SNO Plymouth.[134]

Resource scarcity meant that in February 1917 there were only 14 destroyers available at Devonport, and Jellicoe soon transferred ten more from the Grand Fleet, in addition to a paltry 12 sloops stationed at Queenstown.[135] Aircraft and airship bases had not yet been constructed to cover these approaches,[136] and the Dover barrage, meant to prevent the Flanders U-boat flotillas from crossing the Channel, proved largely ineffective at blocking U-boat transit at this time, as we have seen. Before the introduction of convoys it was hoped that arming merchant vessels and deploying Q-ships would usefully deter and potentially destroy German submarines in the Channel. One of these vessels that scored an important victory in the Plymouth district was HMS *Privet*, previously the 800 ton London and Channel Islands ferry *Island Queen*.[137] Requisitioned by the Admiralty in December 1916 and given the designation *Q19*, on 12 March 1917 this specialized A/S vessel seriously damaged a U-boat 20 miles southeast of Start Point, although

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[132] Copy of Jellicoe to Duff letter, 27 November 1916, National Maritime Museum, Greenwich, DUFF 1

[133] Admiralty Memorandum, 16 December 1916, Anti-Submarine Division papers: Volume I, Organisation and Personnel, TNA ADM 137/2715

[134] Service record of Alexander Edward Bethell, TNA ADM 196/19/332. *The Naval Who's Who, 1917*, p. 23. See also, Nicholas Lambert, *Planning Armageddon, British Economic Warfare and the First World War* (Cambridge, MA: Harvard University Press, 2012), p. 217-8, Marder, *FDSF*, II, p. 134-47, 441, Paul G. Halpern, "Warrender, Sir George John Scott, of Lochend, Seventh Baronet (1860-1917)," in *The Oxford Dictionary of National Biography* (Oxford University Press, 2012). Warrender died shortly thereafter on 8 January 1917

[135] Gibson and Prendergast, *German Submarine War*, p. 160. Jellicoe, *The Submarine Peril*, p. 17-8

[136] Howlett, "The Royal Naval Air Service", p. 125-9

[137] Alan G. Jamieson, *A People of the Sea: The Maritime History of the Channel Islands* (Slingsby, York: Methuen, 1986), p. 463

Privet was heavily damaged in the encounter and sank while being towed into Plymouth Sound.[138] The U-boat encountered was initially believed to have been *U85* but was more likely *UC68,* which had been laying a minefield south of Plymouth before the encounter, although the exact fate of neither boat has been ascertained.[139] UC-type minelaying boats had been particularly active in the Plymouth district that March.

Clearly more comprehensive A/S and trade protection measures were required. As early as 15 December 1916 Duff had drafted a letter to Jellicoe stating his intention to expand surface and RNAS patrols around the British Isles, including in the English Channel.[140] Given the scarcity of patrol craft, and the vastness of the distances involved, Duff proposed that the outgoing DAS, Rear Admiral Vaughan Lee, should prepare an air patrol scheme for the Atlantic approaches, including bases in Ireland, at Falmouth or the Scilly Isles, plus a base at Plymouth (established at Cattewater) and Newyln (Land's End), to cover traffic approaching the Channel.[141] The coasts of these contested waters at the Channel entrance were dangerous for U-boats to approach, the Bishops Rock and Western Rocks formations near the Scillies, the Chaussee de Sein reefs off Finistere, the Casquets reef west of Alderney, and the Minquiers reef south of Jersey, had all plagued mariners for centuries, but were now utilized for coastal protection by merchant trade in the Plymouth district.[142] The U-boat commanders' fear of detection from the air would now contribute to the inherent navigational difficulty of intercepting merchants steaming and sailing along the Western Approaches coastline.

Wing Captain Eugene L. Gerrard arrived to take command of the RNAS squadrons in Bethell's district on 13 March, and on 3 April Gerrard took command of the RNAS South West Group.[143] On 17 April Gerrard and Bethell adopted the scheme proposed by Squadron

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[138] E. Keble Chatterton, *Q-Ships and Their Story*, Kindle ebook (London: Sidwick and Jackson, Ltd, 1922)., chapter 12, loc. 2807, p. 170-1, Messimer, *Verschollen*, p. 104

[139] McCartney, "The Maritime Archaeology of a Modern Conflict," p. 160, Termote, *Krieg Unter Wasser*, UC-Boote, loc. 6922, Messimer, *Verschollen*, p. 306

[140] Abbatiello, *Anti-Submarine Warfare*, p. 88

[141] Jones, *WIA*, IV, p. 45-6

[142] See for example, Rodger, *The Command of the Ocean* p. 172, Jamieson, *A People of the Sea*, p. 418

[143] Service record for Eugene Louis Gerrard, DSO, TNA ADM 273/2/42. After 1 April 1918 Gerard became Brigadier-General in command of the RAF's No. 9 Group

Commander R. B. B. Colmore, of Naval Air Station (NAS) Mullion.[144] Colmore's report, forwarded on 23 April by Gerrard to the new DAS (and Fifth Sea Lord), Commodore Godfrey Paine,[145] described a combination of routine, emergency and contact (destroyer plus seaplane) patrols, arranged so that at least one machine was always kept in readiness to launch and respond to U-boat reports on short notice. In February three H12 flying boats had been flown out to the Scillies, where the Royal Navy was represented by Commander William Oliver and the RNAS by Squadron Commander Ralph Hope-Vere, to begin patrolling the Cornwall approaches.[146] Initially based on the same 'Spider Web' octagonal patrols utilized by NAS Felixstowe, by August the patrol system had evolved to include specified area patrols for emergency response.[147] Bethell also arranged patrol zones for the trawler and auxiliary flotillas in the Plymouth area,[148] and the entire system was networked together by telephone and telegraph cables. W/T stations were established at the Scillies, Land's End, Falmouth, Plymouth and Portland Bill.[149] In addition to French naval aviation forces operating from the coast of Brittany, after June 1917 the Americans began to develop their naval aviation forces in France, which ultimately would have included eight seaplane stations, four non-rigid airship bases and three kite balloon facilities, although only a few of these planned bases were operational when the war ended.[150]

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[144] RNAS Station Index, 31 March 1918, TNA AIR 1/670, in Stephen Roskill, ed., *Documents Relating to the Naval Air Service, 1908-1918* (London: Spottiswoode, Ballantyne and Co. Ltd., 1969), Appendix II, p. 750. See also, Abbatiello, *Anti-Submarine Warfare*, Appendix 2, p. 176

[145] Wing Captain South West Group to Director Air Services, 23 April 1917, TNA AIR 1/644. See also, Peter London, *U-Boat Hunters: Cornwall's Air War, 1916-1919* (Truro: Dyllansow Truran, 1999), p. 55

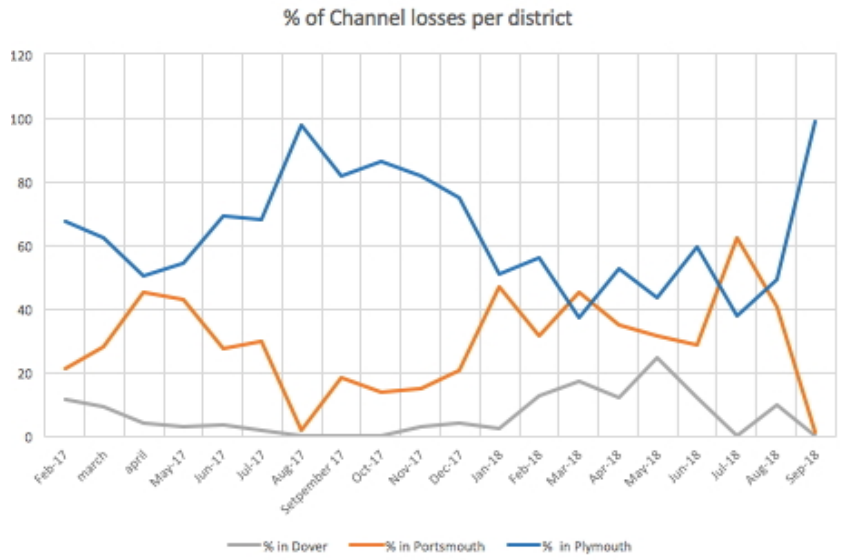
[146] Jones, *WIA*, IV, p. 47. Abbatiello, *Anti-Submarine Warfare*, p. 119, Richard Larn, *The Isles of Scilly in the Great War* (Barnsley: Pen & Sword Books, Ltd., 2017), p. 92

[147] Jones, *WIA*, IV, p. 48. Wing Captain E. L. Gerrard, 'South-West Group-Patrol Orders' 1 September 1917, TNA AIR 1/305. See also Wing Captain Gerrard to C-in-C Plymouth, 19 September 1917, TNA AIR 1/644

[148] Newbolt, *Naval Operations*, V, p. 197

[149] Ibid, p. 197

[150] Rossano, *Stalking the U-Boat*, p. 81



Breakdown by Channel districts showing percentage of total ships sunk and damaged, comparing Plymouth, Portsmouth and Dover between February 1917 – September 1918 (Nearly all losses in the Channel in August 1917 and October 1918 occurred in the Plymouth district).

Convoy escorts were arranged starting on 26 May, with the first convoy running from Gibraltar escorted by HMS *Hardy,* flagship of the Senior Officer of the TB escorts, and supported by one of the H12 flying boat from the Scillies.[151] The commander of the *Hardy* had interesting comments on convoy tactics: in a 6½ knot convoy only one ship in the convoy would use running lights, with the lights of all other ships extinguished. Destroyers should be spread out as far as was possible, with six destroyers used to escort a 15 merchant ship convoy.[152] The need for more destroyers for escort duty was real as demonstrated on 29 June when a U-boat attacked a convoy 50 miles west of Guernsey, but was driven off.[153]

The introduction of inbound convoys on the Atlantic routes forced the U-boats to adjust their tactics, and by August the U-boat commanders switched from the vital inbound to the less significant outbound shipping, traffic that had not yet been organized into convoys.[154] By November Bethell advocated that all Channel traffic should be organized into convoys,

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[151] ACNS Duff to C-in-C Devonport, Rear Admiral Bethell, 'Gibraltar Merchant Ship Convoy Report from Escort,' 26 May 1917, TNA ADM 137/1323. Abbatiello, *Anti-Submarine Warfare*, p. 119

[152] CO HMS *Hardy*, 4th Destroyer Flotilla, to C-in-C Devonport, 5 June 1917, TNA ADM 137/1323

[153] War Cabinet minutes, WC 172, 29 June 1917, TNA CAB 23/3/20, p. 4

[154] Marder, *FDSF*, IV, p. 260

effectively endorsing coastal convoys, a measure the Naval Staff had not yet determined was necessary.[155]

By the summer of 1918 aircraft were playing a major role in the Plymouth command. As Bethell reported in May, it was now routine for D/F intercepts to locate and triangulate the position of U-boats, against which patrolling seaplanes were directed.[156] With the Western Approaches now thoroughly patrolled and provided with convoy escorts, the Flanders U-boats, restricted further by the expanded Dover barrage, changed their area of operations to the East Coast.[157] The U-boats, even hobbled, could still score individual success. Losses in the Plymouth district area were high, averaging 66% of monthly losses in the Channel throughout the unrestricted campaign.

The U-boats concentrated on the Atlantic routes, including the Plymouth approaches, in the summer of 1917 but were forced at first closer to the coasts in the spring of 1918 and then further out into the Atlantic as the convoy system was improved. After the initial flurry of extensive sinkings in the period February to June 1917, when the monthly average for Plymouth was 80,900 tons, the absolute rate of loss decreased (although the *percentage* sunk in the Plymouth district increased), peaking again in the winter of 1917 when in December 115,700 tons were sunk or damaged in the Plymouth area alone. Although losses remained high in the spring the loss rate collapsed in May 1918 when only 37,700 tons were lost, and although a final maximum effort was made in August (35,900) and September (57,500 tons), the tide was clearly turning against the U-boats.

In the case of August 1918 there were at least eight U-boats operating in the Plymouth district (*U107, U113, UB86, UB88, UB92, UB109, UB125, UC49*). Kapitanleutnant Reinhard von Rabenau in *UB88* was the most successful, sinkings three ships worth a total of 6,488 tons and damaging another (in the Portsmouth district) of 4,090 tons. Kapitanleutnant Hans Trenk in *UB86* sank a pair of merchants worth collectively 3,048 tons, and damaged the *Charity* of 1,735 tons. Notably, both von Rabenau and Trenk survived the war.[158] There were 11 boats operating in the Plymouth area in September (*U53, U54, U82, UB87, UB88, UB91, UB104, UB112,*

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[155] Abbatiello, *Anti-Submarine Warfare*, p. 118. See Bethell to Admiralty, 5 November 1917, ADM 137/1324

[156] Admiral Bethell A/S report, 15 May 1918, TNA ADM 137/1486

[157] Abbatiello, *Anti-Submarine Warfare*, p. 118

[158] Michelsen, *Submarine Warfare*, p. 207-8

UB113, UB117, UB125). U-boat 'ace' Kapitanleutnant Erwin Wassner, with over 100,000 tons to his name, on 16, 17 and 18 September in *UB117* sank five ships worth 9,342 tons.[159] Neither *UB104* nor *UB113* returned from their patrols.[160] U-boat veteran Kapitanleutnant Wilhelm Rhein in *UB112* had the distinction of closing out the submarine campaign in the Channel when he destroyed seven ships worth a total 8,397 tons during the first four days of October and damaged another 1,960 ton merchant. Plymouth was the only zone of operations for U-boats in the Channel that October and soon the U-boats would have no friendly bases to return to.

Conclusions

The experience of unrestricted submarine warfare in the English Channel during the First World War suggests several conclusions. First, the cross-Channel convoys from 1914 onwards indicated the correct model for protecting merchant shipping, a model that was gradually adopted by the Naval Staff after May 1917. Although losses in the dense Channel traffic continued, the small tonnage being sunk was nowhere near enough to impact Britain's war effort, despite representing a significant portion of the total merchant tonnage destroyed during the war, because the cross-Channel convoys protected vital shipping. Second, the introduction of coastal convoys in May 1918, combined with further tightening of the Dover barrage, finally reduced Channel losses to a negligible level, while simultaneously raising the risk to U-boats attempting the Channel transit.[161] The ASD believed, in its post-war analysis, that 37 U-boats had been sunk in the Channel, of which 22 have been since confirmed or rediscovered, out of the 203 lost to all causes during the war.[162]

Critically, the relative scale of losses in the Channel has been overlooked. Data compiled for this study demonstrates that losses in the Channel were comparable to the entire Mediterranean theatre in terms of tonnage damaged or sunk. This reflects the astonishing lack of any detailed investigation of the Plymouth district in particular, where the majority of the Channel losses occurred, which was one of the most vital naval districts during the entire war.

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[159] Michelsen, *Submarine Warfare*, p. 218

[160] Messimer, *Verschollen*, p. 215, 224

[161] Waters and Barley, *Defeat of the Enemy Attack on Shipping*, table 2.

[162] McCartney, "The Archaeology of First World War U-Boat Losses in the English Channel", p. 186, Messimer, *Verschollen*, p. 13

There is no study of the Plymouth district or Admiral Alexander Bethell, who commanded there during the submarine crisis.

Early in the war, when the threat to Channel shipping was primarily in the form of enemy surface raids, a combination mitigation-barrage strategy was attempted, with Dover acting as a breakwater in advance of the Portsmouth protected zone. At Plymouth, the dispersal method and approach zones kept losses from scattered U-boats and merchant raiders to a marginal level, but the introduction of unrestricted submarine warfare in 1917 changed the calculus.[163] Material improvements in A/S weapons, mines, and detectors, combined with comprehensive convoys, eventually turned the tables on the U-boats, which by the end of the war were being sunk in increasingly significant numbers by deep minefields, bomb and depth-charge equipped escorts, while being relentlessly exposed by airships and hounded by airplanes. The Dover command faced unprecedented aerial and destroyer attack, and was tasked with the complex and difficult task of blocking the Dover Straits. From the outset Portsmouth was involved in escorting troopships and convoys, providing the model for the Atlantic and coastal convoy network that eventually secured Britain's seaborne trade. The vast oceanic traffic coalescing at the Plymouth command required complex convoy escort arrangements and expansive aerial patrols. Ultimately the Royal Navy's district SNOs, with support from the RNAS and the Naval Staff, and in close cooperation with the French, who completely grasped the difficulty of the situation, and the Americans, whose role would have increased had the war continued into 1919, and the other Allies and neutrals, rose to the challenge and mastered the submarines, the greatest threat that Britain faced during the war.

[163] Webb, 'Trade Defence in War', p. 36