

Operation Sea Lion, the Luftwaffe, the Kanalkampf and the Battle of Britain:

the Defence of Britain in 1940 and Air Power in World War 2

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Abstract

Historians usually consider that if the Germans had carried out Operation Sea Lion and invaded Britain in 1940, the invasion would have been defeated by the Royal Navy. This belief is supported by a wargame conducted by the Royal Military Academy at Sandhurst in 1974. However, if the Germans had carried out the invasion correctly it could have been successful as bombing and landings on the south coast of England would have meant the British would lose the benefits of radar. RAF Fighter Command operating without radar would not be able to provide adequate air cover for Royal Navy ships in the English Channel. Without adequate air cover the Royal Navy will be forced out of the English Channel by attacks from the *Luftwaffe* as warships in World War 2 cannot survive under constant air attack.

Operation Sea Lion was the codename for the proposed German invasion of Britain in 1940. It was, of course, never attempted but there has been considerable speculation as to whether or not it could have been successful. Most historians believe it would have failed due to the superiority of the Royal Navy over the German Navy known as the *Kriegsmarine*. They are wrong as the question of whether Operation Sea Lion would have been successful is dependent upon the outcome of the Battle of Britain and if that battle had been better conducted by the Germans, for example by continuing attacks on radar stations and Fighter Command airfields, the resulting German air superiority would have allowed the invasion. A reasonable degree of German air superiority over the English Channel would have meant the Royal Navy would not have been able to stay in the Channel for more than a few days due to continuous attacks from the German air force known as the *Luftwaffe*.

The Wikipedia entry for Operation Sea Lion as at 29 May 2021 stated:

“Although Operation Sea Lion was never attempted, there has been much speculation about its hypothetical outcome. The great majority of military historians, including Peter Fleming, Derek Robinson and Stephen Bungay, have expressed the opinion that it had little chance of success and would have most likely resulted in a disaster for the Germans. Fleming states it is doubtful whether history offers any better example of a victor so nearly offering his vanquished foe an opportunity of inflicting on him a resounding defeat.^[121] Len Deighton and some other writers have called the German amphibious plans a "Dunkirk in reverse".^[122] Robinson argues the massive superiority of the Royal Navy over the *Kriegsmarine* would have made Sea Lion a disaster. Dr Andrew Gordon, in an article for the *Royal United Services Institute Journal*^[123] agrees with this and is clear in his conclusion the German Navy was never in a position to mount Sea Lion, regardless of any realistic outcome of the Battle of Britain. In his fictional alternate history *Invasion: the German invasion of England, July 1940*, Kenneth Macksey proposes that the Germans might have succeeded if they had swiftly and decisively begun preparations even before the Dunkirk evacuations, and the Royal Navy for some reason had held back from large-scale intervention,^[124] though in practice the Germans were unprepared for such a speedy commencement of their assault.^[125] The German official naval war historian, Vice Admiral Kurt Assmann, wrote in 1958: "Had the German Air Force defeated the Royal Air Force as decisively as it had

defeated the French Air Force a few months earlier, I am sure Hitler would have given the order for the invasion to be launched - and the invasion would in all probability been smashed".^[126],

A [wargame](#) concerning Operation Sea Lion was conducted at the Royal Military Academy Sandhurst in 1974 and was published in the Daily Telegraph. The Wikipedia entry for the wargame on 16 May 2021 stated:

“Assumptions

The scenario assumed:

- The German military had taken until September to assemble the shipping necessary for a Channel crossing.
- The Luftwaffe continued to attack British airfields after September 7, 1940 instead of bombing London during the day, but despite continuous attacks up to September 19 had not yet established air supremacy; albeit that their intelligence assessments proposed that the RAF was at breaking point.^[5]
- The Luftwaffe bombed London at night.
- The Germans had only converted river barges available as transport ships for the first wave. Not a great deal was known about the invasion fleet at the time of the wargame. This represented a gross simplification relative to shipping plans discovered later, which involved nearly 4,000 vessels, including 150 merchant ships and 237 light or auxiliary close escorts, in four invasion fleets. In the actual shipping plans, the second and third echelons of the first wave; consisting of artillery, vehicles, heavy equipment, stores, horses and reserves of personnel, would have crossed the Channel at the same time as the first echelon. In the Game these follow-up forces were held back to cross on the night of S plus one; and were intercepted at dawn on S plus two by a large force of Royal Navy cruisers and destroyers.
- The only ships available to defend the invasion fleet were some U-boats, E-boats and destroyers.
- The invasion fleet was largely unmolested in the crossing, as the Royal Navy ships had to steam south from their bases as far away as Scotland to reach the invasion beaches.
- The bombing of London would destroy railways between East Anglia and the invasion beaches in Kent and Sussex, so that British troops could not be redeployed quickly. This actually happened on September 7, 1940, when all the railways running south from London were cut and took a long time to repair due to the use (for the first time) of delayed action time bombs.^[6]
- Operation Herbstreise was enlarged to make 10,000 men available for a landing in East Anglia, northern England, Scotland, or Iceland (in real life there were three divisions of infantry involved).^[6]

- The Channel Guns had no effect.
- The Home Fleet would send its capital ships south.

The first two days

The game started on September 19, 1940 but the Germans decided that the sea was too rough to attempt a landing. The same happened the next day. The first two days of game time, therefore, consisted of air battles, movement of British units to the south coast, the launching of Operation *Herbstreise*, and embarkation of German units at the French Channel ports. The Luftwaffe bombed Britain's south coast and laid mines in the Harwich, Humber and Thames estuary waters. The Germans landed their *Herbstreise* diversion force in Iceland and laid protective minefields in the Channel. The British took full advantage of their intelligence coup (the huge map only showed SE England) and the two day delay by moving four more divisions to Saffron Walden, Newbury, Crowborough and Royal Tunbridge Wells to bolster the nine already in East Anglia, Kent and Sussex. "Churchill" refused to divert any troops in response to the Iceland invasion.^[2] Paddy Griffith was very disappointed with the map, which he said was unnecessary and on which he wasn't consulted. "On the day of the game its mere existence had the instant, deeply unfortunate effect of revealing to the British team that the invasion would certainly land in Kent, rather than in East Anglia, or wherever else the umpire team had been trying hard the German's deception plan sound convincing." ^[7] The map only included the English coast between Portsmouth and Ipswich.

On the afternoon of September 21, the wind dropped, and the forecast for the next day improved. The German protective minefields were finished, stretching out from the North Foreland. The first wave invasion fleets began to form up at dusk, and begin to cross. They were spotted by a British armed trawler at 11pm, The *Cromwell* warning was issued half an hour later (and the church bells rung), and at midnight the Home Fleet was ordered south.

Invasion

The German first echelon attack was launched at dawn on 22 September 1940 and consisted of 8,000 airborne troops and 80,000 infantry landed in amphibious operations. The invasion fleet suffered only minor losses to Motor Torpedo Boats, however the Germans lost about 25% of the barges used for the first echelon when these were destroyed on the beaches. During this 24-hour period the Royal Air Force lost 237 aircraft (about 23% of its fighting strength); the Luftwaffe losses amounted to 333, also about 23% of its aircraft. Naval engagements were indecisive at this stage as the Royal Navy was still assembling its main destroyer fleet to attack; but a small force of destroyers, supported by the cruiser HMS *Manchester*, attempted to reach the invasion beaches from Portsmouth, and were easily sunk by the German destroyer and S-boat escorts. The

larger ships of the Royal Navy Home Fleet (including battleships, heavy cruisers and aircraft carriers) were not to be committed due to their vulnerability to air attack and U-boats.

The Germans managed to advance a dozen or so miles inland and even captured the ports of Folkestone and Newhaven but the docks at Folkestone had been thoroughly demolished by the British rendering them more or less unusable. British and Commonwealth forces were moved to fully engage in the battle with the first counterattack on 23 September, halting the advance of the Germans towards Hastings and recapturing the western bank of Newhaven. German paratroops were also pinned down by long-range artillery directed onto the captured aerodrome at Lympne by stay-behind forces. At this stage the Germans had few tanks (including amphibious tanks) and only light artillery ashore. An increasing shortage of ammunition was slowly forcing them back towards the sea. The Germans asked "Hitler" if the nighttime bombing of London could stop and the aircraft used to support the invasion. The request was denied. By dusk on 23 September the Germans had the assault troops 10 divisions ashore, but most were halted by counterattacks, and were awaiting the remainder of their equipment, stores and personnel on the second and third echelons.

The second and third echelon barges of the German invasion arrived off the English coast on the morning of 24 September, but only across from Calais and Dunkirk to the beaches in Kent; there would be no follow-up support to the forces ashore in Sussex as there was insufficient air cover and naval defence. At dawn on 24 September the follow-up echelons of German invasion barges were intercepted still 9 miles short of their beach objectives by a Royal Navy fleet of 17 cruisers and 57 destroyers plus Motor Torpedo Boats. 65% of the German barges, three German destroyers and seven E-boats were sunk for the loss of only two British destroyers (sunk by U-boats) plus two cruisers and four destroyers damaged. Some of the accompanying transport ships broke away and headed for Folkestone, but the port was so badly damaged they could only unload two at a time. With the Royal Navy suffering only minor losses, the Home Fleet was ordered to stand by to sail for the English Channel. The German divisions ashore only had enough ammunition for two to seven more days of fighting. Fast steamers and ferries were pressed into service to start an evacuation of German troops from Folkestone and Rye. "Hitler" ordered the remaining reserves to stand down and prepare for redeployment to Poland. Further British air and sea attacks disrupted the German evacuation over the subsequent four days. The remaining German troops in England finally surrendered on 28 September.

Conclusion

Although the first echelon landings were more successful than had been anticipated, the German navy's relative weakness, combined with the Luftwaffe's lack of air supremacy, meant they were not able to prevent the Royal Navy from intercepting the second and third echelon Channel crossings. The Navy's destruction of the follow-up echelon forces prevented resupply and reinforcement of the landed troops. This made the position of the initially successful invasion force untenable; it suffered further casualties during the attempted evacuation. Of the 90,000

German troops who landed only 15,400 returned to France. 33,000 were taken prisoner, 26,000 were killed in the fighting and 15,000 drowned in the English Channel. All six umpires deemed the invasion a resounding failure.”

The military historians and the wargame suggesting Operation Sea Lion would have failed because the Royal Navy would have stopped it, are most likely wrong. This is because, if the *Luftwaffe* had gained a reasonable level of air superiority over the Channel it would have stopped the British Navy interfering with the invasion and it could have gained air superiority by continuing attacks on radar stations and on Fighter Command airfields in southern England and not diverting its attacks to London. It does not need complete air supremacy to force the Royal Navy from the Channel. It needed a degree of air superiority sufficient to allow dive bombing and torpedo attacks on the British ships so that they would either be sunk or forced to withdraw from the Channel.

The assumptions made for the war game seem somewhat arbitrary, especially those concerning the intelligence coup of where the invasion would take place, the weather, the date of the invasion, and the belief that the Germans would allow a Royal Navy fleet of 17 cruisers and 57 destroyers to surprise their invasion barges and sink 65% of them. The Germans would have known the Royal Navy would try to stop the invasion and would have kept the Royal Navy ships under close observation by u-boats and air reconnaissance. They would have kept their barges and invasion shipping well away from the Royal Navy ships. Shallow draught barges could seek sanctuary up the rivers on the French coast where the British ships could not follow them. The British ships would then be subjected to continuous air attack and they could not stay in the Channel for long.

The use of shallow draught river barges would also have the advantage that they might be difficult to sink by torpedoes designed for use against much deeper draught ocean going ships. Also many of the barges were modified by the Germans including putting guns on them so they could defend themselves against the smaller British vessels. The [Siebel Ferry](#), one of the vessels proposed for the invasion, was armed with 88mm guns and 20mm guns. Lightweight unarmoured British Motor Torpedo Boats and Motor Gun Boats might not be effective against the barges because the torpedoes may be ineffective while it is not clear that the British Motor Torpedo and Gun Boats would win a shootout with well armed barges. Even troops on the barges using rifle and machine gun fire could harm the smaller unarmoured British boats. The fourth of the wargame assumptions listed above states the Germans had 237 light or auxiliary close escorts available to protect the invasion shipping. Given also that the *Luftwaffe* would have a much greater presence over the Channel than the British aircraft the British boats would also have to face strafing attacks from Me 109 and 110's armed with 20 mm cannon so it is unlikely the British Motor Torpedo and Gun Boats would be able to stop or significantly contribute to stopping the invasion.

There is of course the German E boat attack on Exercise Tiger at Slapton Sands on 28 April 1944, the Battle of Lyme Bay, when German E boats at night, in the early morning, sunk 2

American LST ships and damaged two more. But this was at night and the Germans took the Americans by surprise and the American LST's had a much deeper draught than the German river barges. The result of the Battle of Lyme Bay was largely caused by carelessness and complacency due to the Allies not having seen E boats in the Channel for some time. The Germans attempting the invasion of Britain would certainly not have been as complacent and careless as the Allies were at Lyme Bay.

There were attempts by RAF Bomber Command in 1940 to bomb the invasion barges. They were not very effective as its bombers were designed for bombing enemy cities and not for attacking naval vessels and invasion barges. The sort of fighter bomber ground attack aircraft used by the RAF later in the war which would have been effective against the German invasion barges were converted fighters such as Hurricanes with 40 mm cannon under the wings, Spitfires with 20 mm cannon and Hawker Typhoons with 6 inch rockets. But in 1940 British fighters were busy trying to stop German bombers bombing Fighter Command airfields, London and if Operation Sea Lion had gone ahead, stopping German bombers sinking British ships. The bombing attacks on the invasion barges were not very successful, not surprisingly as at night Bomber Command aircraft were incapable of hitting a German city, while in daylight they suffered excessive losses due to attacks by German fighter aircraft.

If the Germans had done it correctly Operation Sea Lion could have been successful because of the dominance of air power over naval power which was clearly shown in World War 2. If the Germans had won the Battle of Britain by destroying the radar network on the south coast of England and by continuing the attacks on the Fighter Command airfields and driving Fighter Command from those airfields and away from the Channel, it would have allowed German landings on the south coast of England. Once the landings had happened the Royal Navy would leave its bases in northern Britain and proceed to the coast where the landings had happened. The British ships would be under constant German u-boat and air attack and would have to find their way through minefields placed by the Germans to protect the landings. When they arrive there they will find the German barges have scattered and taken refuge in the rivers of Northern France, such as the Seine, the Somme and the Rance. Guns could be put at the river mouths and along the rivers so British ships could not follow retreating invasion barges, but they would be very unlikely to try to follow the barges, due to the risk of being grounded and moving beyond the range of air cover from RAF fighters. There will be very little for the British fleet to attack as the German navy will have no intention of engaging in battle with the Royal Navy and all the barges will have disappeared and the British ships will be under constant attack from German aircraft. Fighter Command with its remaining Spitfires and Hurricanes will try to protect them, but operating from airfields north of the Thames will not be able to spend a lot of time over the ships and will in any case be engaged by the Me 109's, leaving the German bombers to attack the British warships. Even if the radar stations on the south coast had not been totally destroyed by German bombing the German landings on the south coast would take over the radar stations and deny their use to the British. Due to this, Spitfires and Hurricanes protecting ships would have to maintain standing patrols over the ships, while the Me 109's only have to be over

the ships and engaging the British fighters when the German bombers were attacking the ships. German aircraft would operate from airfields in northern France while the British fighters would be operating from airfields north of the Thames and be operating at close to the full range of the British fighters and would spend less time over the Royal Navy ships. In the small space of the English Channel British warships would be easily found and attacked by German aircraft flying many sorties per day due to the short range of the targets from the German airfields.

How long the British ships will be able to stay in the Channel is uncertain but probably just 2 or 3 days and such a small interruption to the German supply lines will not be too important. Certainly over 2 or 3 days the *Luftwaffe* assisted by u-boats will be able to sink any British ships in the Channel and then the Germans will be able to resupply their troops in England.

The Wikipedia page on Operation Sea Lion as at 22 December 2020 stated:

“The record of the *Luftwaffe* against naval combat vessels up to that point in the war was poor. In the Norwegian Campaign, despite eight weeks of continuous air supremacy, the *Luftwaffe* sank only two British warships. The German aircrews were not trained or equipped to attack fast-moving naval targets, particularly agile naval destroyers or Motor Torpedo Boats (MTB). The *Luftwaffe* also lacked armour-piercing bombs^[43] and their only aerial torpedo capability, essential for defeating larger warships, consisted of a small number of slow and vulnerable Heinkel He 115 floatplanes. The *Luftwaffe* made 21 deliberate attacks on small torpedo boats during the Battle of Britain, sinking none. The British had between 700 and 800 small coastal craft (MTBs, Motor Gun Boats and smaller vessels), making them a critical threat if the *Luftwaffe* could not deal with the force. Only nine MTBs were lost to air attack out of 115 sunk by various means throughout the Second World War. Only nine destroyers were sunk by air attack in 1940, out of a force of over 100 operating in British waters at the time. Only five were sunk while evacuating Dunkirk, despite large periods of German air superiority, thousands of sorties flown, and hundreds of tons of bombs dropped. The *Luftwaffe's* record against merchant shipping was also unimpressive: it sank only one in every 100 British vessels passing through British waters in 1940, and most of this total was achieved using mines.^[44]”

This passage refers to the *Luftwaffe's* inability to sink warships in British waters with aircraft based in Germany. However it is not British waters that are relevant here, it is the English Channel of which the entire southern shore was occupied by the German army by June 1940 allowing all *Luftwaffe* aircraft and in particular the Me 109's to operate over the Channel. As for the Norwegian campaign, the great majority of naval operations were centred around Narvik which was a long way from the *Luftwaffe* bases in northern Germany. The reference to “fast moving naval targets” is obviously fast moving compared to slow lumbering battleships, but the relevant comparison is with fast moving agile aircraft capable of nine or ten times the speed of the naval targets. The small number of small coastal craft sunk by the *Luftwaffe* was because after the early stages of the Battle of Britain, the *Kanalkampf*, just about all British navy and merchant ships were withdrawn from the Channel due to German air attacks and throughout the war they were kept well away from the *Luftwaffe*. The other reason why few British ships were sunk in the war was because they were low priority targets. During the Battle of Britain the

priority targets were Fighter Command airfields and then London became the main target. However British ships trying to stop the invasion of England would be top priority targets and the *Luftwaffe* operating from nearby bases on the north coast of France with full fighter protection would very likely have great success against the Royal Navy ships.

One of the biggest lessons of World War 2 was, if you want to control the sea, you need to control the air above the sea. This lesson was not fully apparent in 1940 but became clear in the Pacific War between USA and Japan. Great naval battles such as the Coral Sea, Midway, Philippines Sea and Leyte Gulf were fought and won almost entirely with airpower. Only to a limited extent at the Battle of Leyte Gulf did the opposing ships even see each other, the rest of the battles were fought by aeroplanes launched from aircraft carriers or occasionally from air bases on land. The dominance of aircraft over naval vessels was also shown by the sinking of the *Prince of Wales* and *Repulse* by Japanese planes and the sinking of the *Yamato* by American planes. The Japanese lost 4 planes destroyed and 28 damaged when sinking the *Prince of Wales* and *Repulse* and the Americans lost 10 aircraft while sinking *Yamato* and a cruiser and four destroyers. This is the reason why we no longer build battleships and cruisers, they cost a lot of money and are easily destroyed by aircraft. Ships and aircraft are not weapons, they are weapons carriers and just about every weapon that can be put on a ship, other than large naval guns, can be put on an aircraft. Aircraft have the advantage of being vastly cheaper and vastly more mobile, while warships are expensive, slow, lumbering targets.

The only thing saving ships from being sunk by aircraft in the Pacific and the Atlantic was the difficulty of finding ships in the vast expanse of those oceans. However that problem does not exist in the small area of the English Channel. The whole of the English Channel is within the range of all German aircraft including the Me 109 and with the small area of the English Channel being flown over by hundreds of aircraft it will be very easy for the Germans to find the British ships.

The best ways for aircraft to destroy ships in World War 2 is by torpedoes and dive bombing. The damage done by American dive bombers at the Battle of Midway shows the effectiveness of dive bombing in the Pacific War and in the European theatre the Stuka pilot Colonel Hans Rudel sank a battleship, a cruiser, a destroyer and 70 landing craft when he was not destroying Soviet tanks. The Germans were particularly well off for dive bombers as both the Ju 87 Stuka and the twin engined Ju 88 were capable of dive bombing. The Stukas of course were withdrawn from the Battle of Britain as they were easily shot down by Spitfires and Hurricanes. However that was when they were attacking Fighter Command airfields in southern England and when the British had the use of radar. Attacks on the British fleet in the Channel would mean the Stukas would be operating at much shorter range and there would be much less opportunity for British fighters to attack them and without radar the British fighters would not be able to attack in great numbers.

The other main German bombers were the Dornier 17 and Heinkel 111 and there is no reason why they could not be fitted with a mechanism for launching torpedoes against ships. The Heinkel 111 was used as a torpedo bomber later in the war in the Atlantic and Arctic. The Me

110 was designed as a twin engined two seater fighter but proved to be useless in air combat with Spitfires and Hurricanes, but it too could have been modified to serve as a torpedo bomber. The modification of aircraft to carry different ordnance was common in World War 2. Hitler turned the Me 262 fighter into a bomber, Hurricanes in the western desert were equipped with 40mm cannon for tank busting and the Germans equipped the Stuka with 37mm cannon for the same purpose. If appropriate torpedo racks were fitted externally to He 111's, Do 17's and Me 110's they could be effective torpedo bombers. The Germans certainly had the technology for this as they had the [Heinkel He 115](#) floatplane which was a torpedo bomber. The Wikipedia entry for aerial torpedoes as at 16 June 2021 states:

“In April 1942, Adolf Hitler made the production of aerial torpedoes a German priority, and the *Luftwaffe* took the task over from the *Kriegsmarine*.^[25] The quantity of available aerial torpedoes outstripped usage within a year, and an excess of aerial torpedoes was on hand at the end of the war. From 1942 to late 1944, about 4,000 aerial torpedoes were used, but some 10,000 were manufactured during the whole war.^[25] Torpedo bombers were modified Heinkel He 111 and Junkers Ju 88 aircraft, but the Focke-Wulf Fw 190 fighter aircraft was successfully tested as a delivery system.^[25]Campbell, N. J. M.; John Campbell. *Naval Weapons of World War Two*. Naval Institute Press, 1986. ISBN 0-87021-459-4.”

As I say, just about any aircraft can be turned into a torpedo bomber, even the Fw 190 fighter.

There are hardly any cases of amphibious landings failing in World War 2. The first attack on Wake Island and a few attacks on the Bataan Peninsula in early 1942, but these can be put against Torch, Sicily, Salerno, Anzio, Southern France and Normandy in Europe and Guadalcanal, Saipan, Peleliu, Tarawa, Okinawa, Iwo Jima, Leyte Gulf, Lingayen Gulf in the Pacific. In all these landings the attacker had overwhelming air and naval supremacy and the Germans did not have this over the English Channel in 1940. However they did have a degree of air superiority and had driven British warships out of the Channel in the early stages of the Battle of Britain. They also had a tremendous advantage in the short distance the invading forces had to travel across the Channel allowing the *Luftwaffe* to achieve air superiority over the Channel and the area of the landings.

How the Germans could have won

If Germany had persisted with attacks on radar stations and Fighter Command airfields and not changed to bombing London, Fighter Command would have been forced to withdraw its Spitfires and Hurricanes to 12 Group airfields north of the Thames. This would have amounted to a concession of air superiority, although not air supremacy, over southern England to the *Luftwaffe*. This would have allowed the invasion of Britain to take place.

When the invasion happened Royal Navy ships from Scapa Flow and other British naval bases would move south to stop the invasion. The Germans knew where the British ships were

based and where they were headed, which was obviously to the English Channel to cut supplies to the German troops who had landed on the south coast of England. They would also know when the British warships would leave their bases which would be as soon as the British became aware of the landings. This would make it easy for the Germans using u-boats and air reconnaissance to track the movements of the British ships to make sure they never get anywhere near the German invasion shipping.

The British warships had a choice of two routes to the Channel. One was through the North Sea which would be the quicker route, the other down the west coast of Britain and through the Irish Sea or alternatively out into the Atlantic. Whatever route was chosen and maybe some ships would go by one route and others by the other route, all ships would go by a zigzag course to avoid torpedoes from u-boats and they would travel at the speed of the slowest ship and this would slow their progress.

When the British ships arrived at the Channel the German invasion shipping would retreat to rivers such as the Seine and the Somme and possibly the Rance. Most of the invasion ships were river barges so they could go up these rivers and the British ships could not follow them due to the size of the British ships and a risk of grounding, and because going up the rivers would take them out of range of British air cover. The German invasion barges were slow, capable of about 5 knots, but the Germans knew that and would make sure they had enough time to escape up the rivers. Temporary evacuation of the Channel would have been planned by the Germans and the initial landings of the Germans troops would be well supplied as they would anticipate a temporary interruption of supplies.

The initial landings would concentrate on the capture and disabling of radar sites, so British fighters attempting to protect Royal Navy ships in the Channel would not have the benefit of radar communication and control. They would also try to secure ports and airfields but they would need some repairs due to previous bombing and British demolition.

Royal Navy ships in the Channel would be subjected to relentless air attacks from dive bombing Ju 87's and Ju 88's and torpedo bombing from torpedo equipped Do 17's, He 111's and Me 110's. Fighter protection, from Spitfires and Hurricanes operating at long range from bases north of the Thames and without radar direction, would be limited. The British fighters operating at the extent of their range would only be able to spend a short time protecting the ships. The Germans on the other hand would be operating at short range from airfields in northern France. The Germans would have the attackers advantage of deciding when to attack and can put overwhelming force into each attack. If the British fleet dispersed to chase the barges which would take sanctuary in a variety of rivers the Germans would be able to concentrate overwhelming air attacks at particular parts of the British fleet while the British fighters would have to provide air cover for all parts of the British fleet as without radar they will have no prior warning of attacks.

The Germans would be creating the situation which they tried to create at the start of the Battle of Britain by engaging the British fighters over the Channel by attacks on British shipping in the Channel. In the Battle of Britain Dowding refused to engage the German fighters over the

Channel and the British simply withdrew their shipping from the Channel. But with an invasion on they can hardly withdraw their ships and the Spitfires and Hurricanes would have to engage the German aircraft without the advantage of radar and from bases north of the Thames. The Germans would also benefit from the recovery of bailed out pilots as they were much better organised to rescue pilots from the sea. The *Luftwaffe* provided their air crew with flares, sea dye, yellow skull caps and one man dinghies and had float planes which would search for pilots and rescue them when found. German pilots could be rescued from the north coast of France or the south coast of England but British pilots if they survived the sea would fall into German hands and become prisoners of war regardless of which coast they reached. The loss of experienced pilots was the greatest problem for Fighter Command throughout the Battle of Britain. The German invasion would act as a lure to draw out the British fleet and Fighter Command Spitfires and Hurricanes so they could all be destroyed in situations favourable to the Germans.

The German attacks on the British fleet would be conducted by dive bombing Ju 87's and Ju 88's and torpedo bombing Do 17's, He111's and Me 110's. The Spitfire and Hurricanes would try to attack the German bombers but would be attacked by the Me 109's. No doubt both sides would lose aircraft and aircrew but with the Germans having the advantage of operating from short range and the British from long range from their airfields many of the German bombers will be able to attack the British ships.

Air attacks on ships in World War 2 were generally successful so long as the attacks were persistent and kept up until the ships were sunk or they moved beyond the range of the attacking aircraft. The Germans had a particular advantage as their aircraft were operating so close to their airfields their fighters could spend far more time over the British fleet than the RAF fighters and the German bombers could carry less fuel so they could carry more ordnance and damaged aircraft could more easily get back to their airfields.

When trying to provide air cover to British ships the British fighters would have to operate without the benefit of radar. This is because if the Germans had persisted with attacks on the radar stations they would have destroyed the receiver huts at the base of the radar towers, within which the radar operators observed the cathode ray tubes and telephoned what they saw to Fighter Command headquarters at Bentley Priory, where the information was collated with other information. The towers themselves were difficult to destroy by bombing as the explosive force of the bombs just goes through the tower framing, but the receiver huts could be destroyed. An even more important reason why the British fighters would not have the benefit of radar is that German troops landing on the south coast of England would be taking over the radar stations and denying their use to the British. The Germans had also discovered by September 1940 that radar could be jammed by radio interference. (Deighton 1990, 277).

RAF fighters operating from 12 Group airfields north of the Thames would have been operating at long range and without radar, so there would be no warning of when the German attacks on British ships were being made. This would mean Spitfires and Hurricanes protecting the ships would have to maintain standing patrols over the ships, while the Me 109's only have to

be over the ships when German bombers attacked the ships. At any given point in time there would only be a small number of British aircraft over the British ships as many planes would be heading back to their airfields, or be landing, or refueling and heading back to the ships. Pilots also need food and sleep so the problem with standing patrols is not just time taken flying to and from the British ships but also with ensuring pilots are in a fit condition to confront the enemy. If there were 900 serviceable fighters available to protect the British ships, probably only 300 would be over the British ships at any given point in time. The Germans on the other hand would be operating at much shorter range and would be able to commit all available resources in specific powerful attacks that would overwhelm the small number of British fighters protecting the British ships. The Germans would have the attacker's advantage of choosing when and where to attack the British ships. The where would be largely dictated by the exact location of the British ships but it would be somewhere in the English Channel which would be decided by the German decision of where to invade for example on the south coast of England. The when however would be absolutely at the discretion of the Germans who could decide when to attack the British ships, for example day or night or both and they can choose what weather conditions to attack in from whatever conditions are available. Cloudy days for example might make dive bombing impossible but torpedo bombing is done at low altitudes and clouds may provide some protection from British fighters.

Let us imagine a British fighter based north of the Thames trying to protect a British fleet in the middle of the Channel. It would have to fly 150 miles to reach the British ships and then would spend a limited period of time above them before it had to fly back to its base north of the Thames. Most of the time it would be flying to the British fleet or it would be flying back to its airfield. When it got there it would have to land and refuel all of which takes time. Because so much time was spent flying to and from the British fleet and refueling at the airfield each plane would spend only a limited time over the British ships.

The width of the English Channel is 20 miles (33 kilometres) at Dover and its maximum width is 150 miles (240 kilometres) so its average width may be around 85 miles (136 kilometres) wide. The distance from Oxford to Portsmouth is 66 miles (107 kilometres) so British fighters from north of the Thames would have to fly 151 miles to reach the British warships. The combat range of a Hurricane is around 300 miles (total range is 600 miles) so it would have to spend half its time flying to and from the British ships. Further time would be spent on take offs, landing and refuelling so probably at any given time only a third or less of the British fighters would be providing air cover for the British ships.

The situation of standing patrols can be compared to that if radar was available, as it was for most of the Battle of Britain. When radar was available pilots would sit around by their aircraft and when German aircraft were detected forming up over France, the British fighters would all take off at the same time and confront the Germans with their full available force. Without radar and having to use standing patrols only a part of the British fighter force would be able to face the full German air force. The Germans would be operating from much closer

airfields on the north coast of France and would have the attackers advantage of choosing the time of the attack and being able to commit all their available resources to the attack.

The actual strengths of both sides in the Battle of Britain are difficult to accurately assess as they varied from day to day due to aircraft being destroyed, new aircraft arriving at airfields and aircraft being repaired. Even when there were plenty of aircraft, there were not always aircrew available to fly them and not all aircraft were immediately serviceable. Immediately serviceable means a pilot can fly it immediately while available means the aircraft requires either minor or more significant work before it can be flown. Collier states on Eagle Day, 13 August 1940, the Germans had 3,358 aircraft with 2,550 immediately serviceable. This consisted of 80 close and 71 long range reconnaissance planes, 998 bombers, 261 Stukas, 31 ground-attack planes and 1,029 single and twin-engined fighters and 80 coastal reconnaissance planes. Fighter Command had 708 fighters and 1,434 fighter pilots available as at 3 August. (Collier, 1968, 285). Killen states total German front line strength deployed against Britain in August 1940 was approximately 2,550 serviceable aircraft including 900 bombers, 250 dive bombers, 800 single engine fighters and 200 twin engine fighters. The British had a total first line strength of 900 Spitfires, Hurricanes and Bolton and Paul Defiants available in July 1940. (Killen, 1967, 133). Deighton states Fighter Command had on 20 July 1940, 531 serviceable fighters out of a total of 609 and had another 289 fighters in reserve. The Germans had 893 Me 109's, 725 of them serviceable, 280 Me 110's, 200 of them serviceable, 316 Ju 87 dive bombers, 248 of them serviceable, 1,260 twin engine bombers, 864 of them serviceable, 134 long range reconnaissance aircraft, 96 of them serviceable and 110 coastal reconnaissance aircraft, 61 of them serviceable. (Deighton, 1990, 131 and 152). Overall the number of single seater fighters was roughly even, say around 900 each.

The British would need to do standing patrols over their ships which would mean at any one time only a third or less of their fighters would be over the ships. If 300 British fighters were attacked by 900 German fighters it is very likely they would not be able to stop attacks by hundreds of German dive bombers and torpedo bombers on the British ships. No doubt some German aircraft would be shot down but the vast majority would be able to release their bombs and torpedoes, many of which would hit the British ships. The German aircraft operating at short range from their air bases will be able to make many sorties per day and will be able to keep up the attacks day after day until the British ships are either sunk or withdrawn from the Channel.

At the same time as the air attacks, German u-boats would be operating in the Channel. In August 1940 the *Kriegsmarine* had only 28 operational u-boats but from short range bases in Germany probably 15 to 20 of these u-boats could be in the Channel at any one time. They will know exactly where the British ships are and the British ships will face constant attacks by the German submarines at the same time as they are subject to air attacks.

The British ships in the Channel could be attacked both in daylight and at night as star shells and parachute flares could provide illumination of the British ships. This would make it easier for German aircraft to find the British ships, who, being slow moving, will remain in the illuminated area for some time, while attacking German aircraft will be in and out of the

illuminated area very quickly. One advantage of night attacks is that unescorted bombers will be able to attack the British warships as the night will protect the bombers for all but a brief period of time in which they would be in the illuminated area. This would mean the Me 109's could be saved for daylight attacks when the bombers would need protection. American dive bombers sank three Japanese carriers in the Battle of Midway in an attack lasting only a few minutes. Once the British ships had left the Channel the resupply and reinforcement of the German troops in southern England could recommence.

The length of time ships can survive when under air attack is most likely to be two or three days. The battles in the Pacific lasted for two to four days before one side or the other withdrew due to excessive losses. The Battle of the Coral Sea lasted four days and resulted in the sinking of three American ships including a fleet carrier and three Japanese ships including a light carrier. The Battle of Midway lasted three days and resulted in the destruction of four Japanese aircraft carriers and one American carrier and numerous other ships. The Battle of the Phillipine Sea lasted two days and resulted in the loss of three Japanese Fleet carriers and the Battle of Leyte Gulf lasted three days and resulted in the loss of three Japanese carriers, three battleships and ten cruisers and eleven destroyers. These battles were all fought at much greater distances than would be involved with German aircraft attacking British ships in the English Channel from airfields in northern France. It would also be a lot easier to find the enemy ships in the English Channel than in the Pacific Ocean, so if anything a battle in the English Channel would be over much quicker than those in the Pacific. It would be surprising if the British ships lasted more than a day or two in the Channel given that they would be easy to find and the attacking aircraft could fly many sorties per day due to the short distance from their airfields to their targets.

How long German troops could survive in southern England cut off from their supply lines across the Channel is a matter of conjecture. However it is likely to be much more than the 6 days suggested in the wargame referred to above. In 1940 the German army was predominantly horse drawn and there would have been plenty of grass in southern England in September 1940. German troops will be able to survive in Southern England far longer than the Royal Navy would be able to survive in the English Channel under constant air attack. German troops survived when cut off in Stalingrad from 23 November 1942 and surrendered on 2 February 1943 a total of 72 days, while the Demyansk Pocket also survived 72 days from 8 February to 21 April 1942 before relieving German troops broke through to them. The Kholm pocket survived from 23 January 1942 to 5 May 1942 a total of 105 days before relief. Life would probably be a lot easier for cut off German troops in September in southern England than in Russia during the middle of winter.

If necessary German troops could be supplied by air from aircraft landing on any clear flat surface in southern England or by parachuting supplies to the German troops. If that was to prove difficult in daylight due to Fighter Command interference, the air supply could be done at night. It may also be possible to get supplies across the Channel by night in small fast boats

avoiding the British ships and there would be supplies captured from the British in southern England.

The actual German landings were intended by the German army to be on a long front from Ramsgate to Portsmouth. This would seem to be a wise decision as it would allow the removal of a large part of the British radar network and where one attack might fail, others would be likely to succeed and as they push inland it would mean the areas where the attacks are pinned down on the beaches would have to be abandoned by the British as their forces would be in danger of being attacked in the flank or rear by the German forces involved in the successful landings. A long front would also make it a lot harder for the British fleet to block the flow of supplies to the German troops.

The river barges and other shipping used by the Germans would not be as sophisticated as the landing craft used on D Day 6 June 1944 by the Allies, however the beach defences on the south coast of England would be nothing like what the Germans had in 1944 as the south coast of England had only become vulnerable to invasion in June 1940 so there would have been little time to build coastal defences. The British also thought it was likely the landings could be on the east coast of England and this would mean British troops would be spread out and not concentrated on the south coast to stop the invasion. The British had 26 ill equipped divisions as enormous quantities of equipment had been left behind at Dunkirk in August 1940 to oppose 25 experienced and well equipped German divisions. (www.ww2-weapons.com/battle-of-britain). In these circumstances it is quite likely the landings would be successful and the German troops would be able to drive north and conquer Britain.

A further point is that even if the Germans did not invade in September 1940 they could still invade later in the year. This could be more difficult than in September due to the weather conditions, but more difficult does not mean impossible. The assumption that the Germans had to invade in September 1940 or wait until 1941 is wrong. Any delays in the German invasion would give more time for a British army short of equipment due to Dunkirk, to rearm and equip so the Germans would want to invade as soon as they could. The [Weather on line](#) website shows the weather for various months of the year at places such as Dover and the Isle of Wight. The average wind speed at Langdon Bay, Dover is 23 kph in October, 24 kph in November, 26 kph in December, 25 kph in January. It is 19 kph in June and 18 kph in July, 17 kph in August and 19 kph in September. The equivalent figures for St Catherine's Point on the Isle of Wight are June 17 kph, July 22 kph, August 22 kph, September 21 kph, October 24 kph, November 23 kph, December 25 kph, and January 24 kph. It gets up a bit in October but it does not seem to be a massive increase. Does all the shipping disappear from the Channel in October, November and December each year ? War is always difficult and is not always fought in the best conditions but it can still be fought even when the conditions are not perfect.

The conclusion I would reach is that if the Germans had done it right Operation Seal Lion could have been successful. The idea that the Royal Navy could have intercepted and destroyed German invasion shipping is very unlikely as the Germans would have known of the location of the British ships at all times. German air reconnaissance and u-boats would be able to track the

Royal Navy ships and when they got close to the Channel the German invasion shipping could take refuge in French rivers. This would cause an interruption of supplies to German troops in southern England but the German troops will be able to survive much longer than the six days suggested by the wargame. However it is likely the British ships would only last a few days in the Channel due to *Luftwaffe* and u-boat attacks. The British fighters would not be able to stop the *Luftwaffe* attacks as the absence of radar and the need for standing patrols would stop the RAF fighters giving effective protection to the British ships. When the British ships were sunk or driven from the Channel, the supply of the German troops in southern England could recommence. Given the obvious quality of the German army in 1940 and its mastery of the new *Blitzkrieg* method of war and that the British had left an enormous quantity of equipment at Dunkirk the German army could well be victorious in Britain.

The assumptions in the wargame, such as the intelligence coup forewarning of where the invasion will occur, German troops surrendering after six days, the Royal Navy surprising the German invasion shipping, seem almost designed to ensure a British victory. The wargame seems almost to be an assertion of British patriotism rather than an objective evaluation of military realities. A claim of victory in a battle that was never fought. The same could be said of some of the books dealing with Operation Sea Lion. Many are written by British authors, in English, for the British market and do not seem to me to be completely objective evaluations of the chances of success of Operation Sea Lion. I write as a strong Anglophile but my loyalty is to the objective truth rather than to any particular country. Britain has much to be proud of such as its achievements in science and technology and the British Empire which brought modern science and technology and political ideas such as democracy and the rule of law to much of the world. It also stood up to appallingly evil dictators like Adolf Hitler, even when it had to stand alone. It has no need to invent imaginary victories for battles that never took place and would quite possibly have been defeats.

Bibliography:

- Collier, Richard (1968) *Eagle Day: The Battle of Britain August 6-September 15 1940*, Pan Books Ltd, London
- Cox, Richard (1974) *Appendix 1: The Invaders Reach Berkshire, The Daily Telegraph Magazine No 497, May 17 1974* pp 14-21
- Deighton, Len (1990) *Fighter: The True Story of the Battle of Britain*, Grafton Books, London
- Holland, James (2010) *The Battle of Britain*, Transworld Publishers, London
- Johnson, J. E. (1968) *Full Circle*, Pan Books Ltd, London
- Killen, John (1967) *The Luftwaffe: A History*, Sphere Books Ltd, London
- Overy, Richard (2000) *The Battle of Britain: The Myth and the Reality*, W. W. Norton & Company, New York
- Shirer, William L (1964) *The Rise and Fall of the Third Reich*, Pan Books Ltd, London
- Trevor-Roper, H.R. (ed) *Hitler's War Directives 1939-1945*, Pan Books, London

Websites:

[World War 2 database](#)

[WW2 weapons.com](#)

<https://www.ww2-weapons.com/battle-of-britain/>

[Uboat.net](#)

[Weather online](#)