

Best Available Copy

LEVEL

2

AD A 089275



The views expressed in this paper are those of the author and do not necessarily reflect the views of the Department of Defense or any of its agencies. This document may not be released for open publication until it has been cleared by the appropriate military service or government agency.

20 May 1980

ULTRA AND THE CAMPAIGN AGAINST THE U-BOATS IN WORLD WAR II

by

Commander Jerry C. Russell
United States Navy

DTIC
SELECTE
SEP 19 1980
S C D



US ARMY WAR COLLEGE, CARLISLE BARRACKS, PA 17013

Approved for public release;
distribution unlimited.

Best Available Copy

DDC FILE COPY

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER (6)	2. GOVT ACCESSION NO. AD A089275	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) ULTRA AND THE CAMPAIGN AGAINST THE U-BOATS IN WORLD WAR II.		5. TYPE OF REPORT & PERIOD COVERED (9) Study project
7. AUTHOR(s) Commander Jerry C. Russell		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Army War College Carlisle Barracks, PA 17013		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS (11)
11. CONTROLLING OFFICE NAME AND ADDRESS (12) 45		12. REPORT DATE 20 May 1980
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		13. NUMBER OF PAGES
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The problem addressed is the extent to which the United States Navy used Ultra, or Special Intelligence, in the campaign against the German U-boats. Information was gathered through published and unpublished sources. Through a chronological approach, United States Navy involvement is traced from entry into the war until its conclusion. Many factors are involved in the final outcome of the war and Ultra is only one. The Battle of the Atlantic was long and gruesome rather than short and spectacular. The United States		

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

Navy used Ultra along with technology, tactics, brilliant leadership and courageous men at sea to win the Battle of the Atlantic in World War II. The lessons for the future are clear. If the United States intends to oppose the Soviet submarine force at sea anywhere in the world, then we must maintain the lead in intelligence, tactics and technology. Further, and most importantly, we must strive to regain superiority of forces in those ocean areas where our interests are at stake.

Best Available Copy

Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DDC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or special
A	

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE(When Data Entered)

11

7

USAWC MILITARY STUDIES PROGRAM PAPER

ULTRA AND THE CAMPAIGN AGAINST THE U-BOATS IN WORLD WAR II

INDIVIDUAL STUDY PROJECT

by

Commander Jerry C. Russell
United States Navy

US Army War College
Carlisle Barracks, Pennsylvania 17013
20 May 1980

The views expressed in this paper are those of the author and do not necessarily reflect the views of the Department of Defense or any of its agencies. This document may not be released for open publication until it has been cleared by the appropriate military service or government agency.

Approved for public release ;
distribution unlimited.

AUTHOR(S): Jerry Russell, Cdr, USN

TITLE: Ultra and the Campaign Against the U-boats in World War II

FORMAT: Individual Study Project

DATE: 20 May 1980

PAGES: 38

CLASSIFICATION: Unclassified

The problem addressed is the extent to which the United States Navy used Ultra, or Special Intelligence, in the campaign against the German U-boats. Information was gathered through published and unpublished sources. Through a chronological approach, United States Navy involvement is traced from entry into the war until its conclusion. Many factors are involved in the final outcome of the war and Ultra is only one. The Battle of the Atlantic was long and gruesome rather than short and spectacular. The United States Navy used Ultra along with technology, tactics, brilliant leadership and courageous men at sea to win the Battle of the Atlantic in World War II. The lessons for the future are clear. If the United States intends to oppose the Soviet submarine force at sea anywhere in the world, then we must maintain the lead in intelligence, tactics and technology. Further, and most importantly, we must strive to regain superiority of forces in those ocean areas where our interests are at stake.

TABLE OF CONTENTS

	Page
ABSTRACT	ii
LIST OF TABLES	iv
CHAPTER I. INTRODUCTION	1
Statement of Problem	1
Investigative Procedure.	1
Organization of the Paper.	2
II. UNITED STATES ON THE DEFENSE	3
East Coast Massacre.	3
Ultra, Great Britain and Blackout.	4
Organizing to Fight.	6
The Code is Broken	8
Ultra and Convoys.	10
III. UNITED STATES ON THE OFFENSE	14
Tenth Fleet Established.	14
The Escort Carriers.	15
Ultra and the Bogue Cruise of June	16
The German Refueler Submarine.	18
The Sinking of U-487	19
The Sinking of U-117	21
The End of Summer.	22
IV. THE FINAL MONTHS	26
Ultra Consistently Current	26
After D-Day.	27
The Capture of U-505	28
The Final Days	29
V. CONCLUSION	32
Observations and Recommendations	34
BIBLIOGRAPHY	38

LIST OF TABLES

	Page
Table 1. The Submarine Refueling Fleet	24
Table 2. The Tonnage Battle.	30

CHAPTER I

INTRODUCTION

It has only in the last few years been generally known that at certain periods during World War II the allies were able to read German message traffic. This information, called special intelligence, became known as Ultra. The question for historians is how much must be rewritten in light of this knowledge? An examination of some campaigns of the war and the effect of Ultra on them certainly needs to be undertaken. This study is an attempt to look at the Battle of the Atlantic and the part that Ultra played in its outcome.

STATEMENT OF PROBLEM

The existence of Ultra must have had an impact on the conduct and outcome of the campaign to counter the German U-boat force in World War II. The problem was to discover how much special intelligence was available, how it was used and its impact on the battle. In order to keep the study within manageable proportions, the study is directed at United States involvement and how United States forces fought the Battle of the Atlantic with Ultra.

INVESTIGATIVE PROCEDURE

The research procedure consisted first of extensive reading on the Battle of the Atlantic, both newer and older treatments of the subject. Second, two trips to the National Security Agency were made where information was sought that could be used in an unclassified report. Some information has been declassified, such as the OP-20G final report series volumes.

These were used extensively throughout. The next and final step was to reexamine selected events that appeared in the histories in light of Ultra.

ORGANIZATION OF THE PAPER

The paper is organized in chronological fashion as that seemed to be the most direct method of attacking the problem. The study by necessity devotes some discussion to British involvement when it may have had a direct bearing on United States actions. Some organizational aspects are also discussed because it facilitates an easier explanation of the use of Ultra by Naval authorities.

In the conclusion, some observations and recommendations are discussed. Some of these could perhaps have been made without knowledge of Ultra. They were nevertheless enlightening to this researcher and so included.

CHAPTER II

UNITED STATES ON THE DEFENSE

When the United States formally entered the Atlantic war in December of 1941, Great Britain had been struggling to survive against the German U-boat for over two years. The United States had been involved, however, for some time before December 1941, as American vessels were being sunk on the high seas enroute across the Atlantic.

EAST COAST MASSACRE

Desperately short of escorts for the trans-Atlantic convoys, the United States was now faced with the tremendous problem of also protecting coastal shipping along the eastern seaboard. Coastal convoys were the eventual answer, but without escorts or adequate air cover, a convoy was merely a massing of targets for the U-boats.

The German U-boat Command under the able leadership of Admiral Karl Doenitz, wasted little time in taking advantage of the opportunity to pile up the tonnage sunk figures. In January of 1942, the U-boats had arrived and inflicted heavy losses in coastal waters during the early months of that year.

The United States Navy had prepared as best they could for this eventuality before the war by gathering on the eastern seaboard the nation's scant resources in coastal antisubmarine vessels and aircraft, consisting mainly of lightly armed small craft. Along with Army, Navy and Civil Air Patrol aircraft, these US forces were no real match for the enemy they faced, but were useful in keeping lookout and rescuing survivors. They may, as well, have interfered with the otherwise free movement the U-boats enjoyed.¹

America's first year at war with the U-boats was gloomy at best. The early months of 1942 were a near disaster for the Allies. In March of that year, German U-boats sank approximately a half million tons of shipping, a great deal of it within the eastern sea frontier boundaries. Admiral Doenitz at mid-year had approximately 60 to 65 operational submarines and was able to spread his operation into the Caribbean and Gulf of Mexico. The well trained, and by now seasoned, U-boat commanders were creating a massacre of monstrous proportions. However, the United States proved strong enough to overcome the tremendous loss of shipping and hold the line against the U-boats. Throughout that year only 15 German submarines were destroyed by United States forces.²

There is little doubt that the United States was ill-prepared for war and particularly for a campaign against a menace such as the unrestricted submarine warfare waged by the German Navy in the Atlantic Ocean. Clearly, if the war was to be won, the U-boat had to be neutralized. The tons of materials needed to defeat Germany on the continent would never be delivered to Great Britain and the Soviet Union otherwise. In order to exercise the full potential of United States industrial capacity and allow the arsenal of democracy full reign, then the U-boat problem had to be resolved.

ULTRA, GREAT BRITAIN AND BLACKOUT

The British had by necessity been deeply involved with the U-boat problem for many months. They were using every conceivable means available in order to counter this deadly menace. One of these was Special Intelligence, or as it has become known, Ultra.

Cracking the German Naval ciphers was a far more difficult task than that of breaking the German Air Force or Army codes. The British had been making use of radio intercept information since early 1940 when "The Bomb"

was put into operation at Bletchley Park. This first useful result was related to the Luftwaffe.³ The Naval Enigma Code, however, had resisted all attempts at decyphering and the British realized that a capture of the German cypher machine was necessary to any useful decryption program.⁴ The effort to capture a German Enigma machine intact met with success in May of 1941 when, on the eighth of that month, U110 attacked a convoy south of Greenland. The U-boat was heavily counterattacked by escorts. The submarine surfaced after sustaining heavy damage rather than being sent to the bottom with the crew still aboard. A boarding party was sent aboard the U110 after the prisoners had been removed and put below so that they could not see what was happening. Perhaps fortunately, the U-boat sunk before it could be towed to Ireland. This, plus the fact that the former U110 crew had no knowledge that the submarine was ever boarded, made the secret of the capture secure throughout the war and as late as 1958.⁵ Now with an Enigma machine and accompanying material in hand, the British, for the first time in the war, were gaining an upper hand in the intelligence battle. A quantitative jump in knowledge of the German U-boat fleet, its disposition, state of readiness and tactics were available. The British were able to read the German Naval code "Hydra" almost currently. From June until December, Bletchley Park was able to read Naval traffic within approximately 48 hours.⁶

As well as the exceptional value to be gained by the increasing knowledge about the German U-boat employment, this special intelligence was used in a tactical way that related to the surface war. The knowledge gained from Ultra information played a key role in the devastating blow that the British dealt the German supply fleet in June. Without a doubt, the British morale needed the boost that this success must have given it. However, it was also evident afterward that they may have compromised the source of their knowledge

simply because it was so successful. The German Naval Staff did mount an inquiry as to a breach of security but concluded that the British knowledge was due to spies, agents and happenstance rather than their ability to decypher and read German message traffic.⁷ Whether everyone on the German Naval Staff was convinced of the truth of this is highly suspect. For one reason or another the Hydra code was replaced in February of 1942 by the more complex Triton code. This act blinded the code breakers, both British and American, throughout most of the remainder of the year. The horrible shipping losses suffered during this period may be as much attributable to the lack of special intelligence as to the shortage of escorts and airplanes. Without Ultra information of the U-boat movements, routing convoys to avoid them was extremely difficult. The Allies used whatever information they could, but it was always incomplete, often not accurate and occasionally misleading. The high frequency direction finding system was operating but the area encompassed by the HDF "fix" was often far too large to be of much use except to confirm the already certain knowledge that U-boats were operating on the North Atlantic convoy routes. By reliance on past patterns, sightings and HFDF, however, the Allies were able to keep their heads above water for the ten-month period of Ultra blackout.

ORGANIZING TO FIGHT

A major event took place during this period in terms of organizing to fight the Battle of the Atlantic. When America entered the war, the United States Navy did not have an equivalent of the British Operational Intelligence Center. Partly because of this, operational use of the foreknowledge of Operation Paukenschlag, the U-boat campaign along the eastern seaboard, was minimal.⁸ On December 18, 1941 President Roosevelt signed Executive

Order 8984 establishing Commander in Chief, US Fleet (COMINCH). This act contributed greatly to the US Navy's effectiveness in fighting both Atlantic and Pacific wars.⁹ Admiral Ernest J. King assumed duties as COMINCH on 20 December and began to immediately organize to fight. This involved the transfer of some functions from the Chief of Naval Operations organization to the more operationally oriented COMINCH organization. One of these was the operations division in January of 1942. Two sections of immediate importance to the U-boat campaign were the Operational Information Section (F-35) formed in mid-January and the Convoy and Routing Section (F-37), which was established in mid-May 1942 by transferring it to the functions of Convoy and Routing from (OP-37) of CNO. These two sections were critical to operations against the U-boat. F-35 kept posted on charts in a "War Room" the location of U-boats. The tracking of German submarines and the detouring of merchant shipping whenever possible was one of the most important activities of F-35.¹⁰ Later in the war, a combat intelligence center was established and performed this function after mid-1943.

The Communication Division of the Chief of Naval Operations Organization was one of the OPNAV divisions to have operational responsibilities. This division (OP-20) was quartered in a former seminary on Nebraska Avenue in Washington, DC. Part of this division was the section responsible for providing communication intelligence to COMINCH including Ultra information when it was available. OP-20G, however, also provided HFDF fixes and the so-called TINA fingerprint signatures, which were oscillograph recordings that were an attempt to identify individual U-boat radio operators by their CW sending techniques. Ultra information was delivered by separate secure teleprinter to COMINCH by landline and only a very few were privy to it or even knew of its existence. Thus, by the end of 1942 when the Triton code

was broken and Ultra blackout ended, the United States was organized to take full advantage of the information to be gleaned by reading the enemy's mail.

The British, having been first in the business of breaking and reading German message traffic, had assumed the leadership in the Battle of the Atlantic. Each Allied Nation, however, had responsibilities for convoy routing, protection and anti-U-boat operations, in areas that were agreed upon. Close cooperation existed between the British Operational Intelligence Center and the American Atlantic section counterpart in COMINCH headquarters. Even though OP-20G was supplying Ultra information directly to the appropriate people in COMINCH staff, it worked closely with Bletchley Park with whom crypt-analysis information was freely exchanged. There was as well a secure link between the two Allied Tracking Rooms which allowed for a free and open exchange of information at the working level.¹¹ This unique network of information among the Allies no doubt had a synergistic effect and probably made Ultra information far more valuable than it otherwise might have been.

THE CODE IS BROKEN

In December 1942 the Allies broke the German Triton code. Two things worked against them, however. First, unknown to the Allies the German intelligence "B" service was decrypting the Allied convoy codes. Working pretty much in the same manner as Bletchley Park and OP-20G, the Germans were able to piece together a great deal of information about the convoy system, including precise convoy timetable information.¹² This allowed Doenitz to place his wolf packs across the convoy lanes at the appropriate times and places to inflict the maximum damage. The second thing working against the Allies was that even though the initial breakthrough in decryption of German traffic had taken place, the messages were not being decrypted and read in

time to be of direct operational use and in fact for the most of the month the traffic was not decrypted until after the operation had already taken place.¹³ In order for Ultra to have anything but historical value, it had to be timely.

During this period and up until mid-1943 the Allies were on the defensive and the U-boats had the upper hand. The lack of timely Ultra information in December of 1942 was costly to the Allies. It was never easy, however, even when the codes were being read currently to take full advantage. First, even though the basic cypher was broken, the Germans were changing codes on a daily basis. Further, even when decrypted messages were coming in currently, they were often of little use. Some were fuel reports or weather reports from transiting U-boats nowhere close to a possible attack position on a convoy while others were directives from Doenitz that contained no position or other immediately useful information.¹⁴ Thus, the year 1942 came to close with the U-boats still retaining the upper hand in the Battle of the Atlantic.

Calendar year 1942 was the worst year of the war for the Allies in the Battle of the Atlantic. Even though the United States industrial machine was now beginning to provide the shipping necessary to keep the supplies flowing, there was a net loss of tonnage as the ships could not be replaced fast enough to keep up with the losses to the U-boats. At the end of the year, 8½ million tons of Allied shipping had been sunk in the preceding 12-month period.¹⁵ Against this loss the Allies had sunk only 85 U-boats, giving the Germans the best end of a very uneven trade of one U-boat sunk to nearly 100,000 tons of Allied shipping sent to the bottom of the Atlantic Ocean.

ULTRA AND CONVOYS

The end of spring 1943 was a turning point in the Battle of the Atlantic. The Allies were growing stronger and would soon gain supremacy over the U-boats. Many factors come into play in accounting for the Atlantic battles. One of them is the Ultra intelligence that for the first time was to be a factor, from 1943 onward, as far as United States involvement is concerned. With the cracking of the Triton code, OP-20G begins to supply timely information more and more rapidly. By February, traffic was being read with an average time lag of a little over 24 hours.¹⁶ How much credit the Ultra intelligence should receive for greater Allied success is extremely difficult to pin down. Many other factors, such as radar, aircraft coverage, sonar, more escorts and better training all had an effect and it is the combination of all of these and other factors, of which Ultra is only a part, that led to final victory. The timely reading of German Naval traffic, however, contributed and while it may be a coincidence the German U-boat success was more and more limited after the spring of 1943 when traffic was being read almost currently.

In early February the U-boats made contact with an eastbound convoy, SC-118, and attacked it with some success. This was the first successful attack on any North Atlantic convoy since December. Considering the number and size of the convoys that were at sea on a given day, it seems clear that knowledge of the wolf pack locations played a significant part in convoy protection. At this point in the war, large convoys were departing the east coast of North America every 10 days.¹⁷ It is presumed that westbound convoys sailed at about the same rate.

The successful attack on SC-118 must be qualified. Against the 65 ships in that convoy 10 were sunk. Of the nine U-boats that participated in the

attack, three were sunk and five were damaged. Three were so badly damaged that they returned to port. It was obvious from traffic read by OP-20G that Doenitz gave specific instructions for each U-boat to reconstruct its part in the operation in detail.¹⁸ This message sent on the 9th of February allows some of the frustration to show that Doenitz must have felt at being unable to do far better than that. Iceland based Liberator aircraft provided excellent air cover for this convoy and this combined with wolf pack disposition information gleaned from Ultra and other sources prevented a complete U-boat success.

It was not always the case in 1943 that the convoys and Ultra would prevail over the U-boats. An example is the campaign that took place in a 6-day period beginning on the 18th of February. Even Ultra couldn't prevent the accidental encounter of U-boats with a convoy and sometimes there was nothing that could be done with the information except to watch the battle unfold. Three successive westbound convoys--ON 165, ON 166 and ON 167--came under attack by U-boats starting when U-69 enroute home in company with other U-boats, all low on fuel, lighted ON 165. Only three ships were sunk in this convoy but ON 166, which followed, took several losses from U-boats that attacked it over the 6-day period. By afternoon of the 22nd, approximately 20 U-boats were attacking the convoy. Low on fuel, they were ordered by U-boat Command to press the attack anyhow. Sinking reports were streaming in.¹⁹ The U-boat Commanders were commended in message traffic on the 26th of February for their persistence and zeal in continuing the attack. It was deemed a great success. Twenty-three ships were claimed sunk with seven others torpedoed.²⁰

Even though the above traffic was being read with only a 24-hour time delay, there is probably little that COMINCH could have done to help the

situation even if OP-20G had been able to give him current time information. By the time the convoy was attacked, it was too late to do anything except fight. Any diversion to avoid an attack would have had to come sufficiently early so that the U-boats could not catch the convoy and get into attack position.

In March, German U-boat traffic was being read with about a 2-day time delay.²¹ This was apparently sufficient to tell the location and numbers of submarines in the various wolf packs. At this time Doenitz had about 120 U-boats at sea in the Atlantic. Because of this it was extremely difficult to avoid contact. During this month, German U-boats sank more tonnage than any other single month. After March, however, the U-boat began to decline somewhat from the menace that it had been up to then. Aircraft and airborne radar along with more and better escorts were turning the tides. The U-boats had no place to hide by late spring. The air gaps were covered and attempts by U-boats to surface for attacks were thwarted more often. By May, Admiral Doenitz must have known he was beaten as he pulled his U-boats away from the North Atlantic convoy routes.

CHAPTER II

FOOTNOTES

1. Fleet Admiral Ernest J. King, US Navy at War 1941-1945, p. 80.
2. Ladislav Farago, The Tenth Fleet, p. 71.
3. Jurgen Rohwer, The Critical Convoy Battles of March 1943, p. 237.
4. Patrick Beesly, Very Special Intelligence, p. 70.
5. Ibid., p. 71.
6. Ronald Lewin, Ultra Goes to War, p. 209.
7. Beesly, p. 90.
8. Ibid., pp. 106-107.
9. Rear Admiral Julius Augustus Furer, Administration of the Navy Department in World War II, p. 126.
10. Ibid., p. 151.
11. Beesly, p. 169.
12. Rohwer, p. 33.
13. United States Navy, World War II OP-20-G Final Report Series on the Battle of the Atlantic Volume II, p. 4.
14. Beesly, p. 171.
15. King, p. 206.
16. United States Navy, p. 26.
17. Rohwer, p. 29.
18. United States Navy, p. 25.
19. Ibid., p. 29.
20. Ibid., p. 29.
21. Ibid., p. 48.

CHAPTER III

UNITED STATES ON THE OFFENSE

By the spring of 1943 it was clear to the United States and Great Britain that at least a temporary upper hand had been gained over the U-boats. The German submarine force was sinking Allied shipping only with great difficulty in the face of surface escorts and particularly Allied air power. The convoy system was a success but in order to truly win the Battle of the Atlantic the Allies had to take the offensive and strike at the U-boats on Allied terms.

TENTH FLEET ESTABLISHED

The Tenth Fleet was formally established on 20 May 1943 and was known as the fleet without a ship. The Tenth Fleet had its origins in a small unit called the Atlantic Fleet Antisubmarine Warfare Unit which was established in Boston. This small unit reported to the Commander in Chief, Atlantic Fleet. Having been set up on 7 February 1942, its function was to plan anti-U-boat patrol and detection activities on the Atlantic Coast. During a visit by the Coordinator of Research and Development the availability of scientists at the Massachusetts Institute of Technology working for the National Defense Research Committee was discussed. This was the origin of the Antisubmarine Warfare Operational Research Group (ASWORG) composed of civilian scientists who were instrumental in the technical advances that kept United States antisubmarine warfare forces ahead of the U-boats.

Shortly after the scientists were brought in, the small Boston unit was transferred to COMINCH headquarters and became the nucleus of the Anti-Submarine Division, which eventually evolved into the Tenth Fleet.¹

Admiral King, as COMINCH and also Chief of Naval Operations, had clearly in mind what it was that he wanted from the organization. He had conceived the idea of a Tenth Fleet as a correlating and supervisory agency that could shift forces as needed. As a fleet it would have the same status and powers of any other major command.² This then would provide the organization with the flexibility and control necessary to combat the German U-boats.

In support of this development a Combat Intelligence Division was established in the summer of 1943. Part of this group was the Atlantic section (F-21) whose principle function was the tracking of U-boats. This Atlantic section of Combat Intelligence was the direct offspring of the two former sections (F-35 and F-11), both of which were in the "Chart Room" and "War Room" business. From the summer of 1943, the Tracking Room of F-21 organization and CP-20G worked in close coordination to help defeat the German U-boat.

THE ESCORT CARRIERS

By the summer of 1943 the escort carriers were in the US Navy in force and were now of sufficient strength that along with surface ships could be combined into hunter-killer task groups to seek out German submarines.

The escort carriers, used extensively in the Pacific, were built in great numbers during the war. Some were used to provide air cover in the mid-Atlantic as Allied air cover from land bases rimming the Atlantic extended only approximately 800 miles to sea.³ Thus, to fill a need of providing mid-Atlantic air cover, the heart of the Allied offensive anti-submarine force was born.

The escort carrier was not a large vessel and some of them were miscalled "Jeep" carriers as they were of an earlier design than the Kaiser class and

were built on freighter hulls. Ten of these were of the Bogue class. Bogue and others of her class, Card, Core, Croatan, and Block Island made enviable records as submarine hunters.⁴ It was in fact Bogue class carriers that were the primary ships of the Atlantic hunter killer group. These carriers were capable of ranges of 26,300 miles at 15 knots and carried 16 freighters and 12 torpedo bomber aircraft. Also equipped with anti-air mounts and 5-inch/38 guns, the Bogue class was 492 feet in length and displaced 14,200 tons.⁵

ULTRA AND THE BOGUE CRUISE OF JUNE

The first sinking of a U-boat in a purely offensive action by the United States took place in June 1943. The carrier Bogue with her escorts as task group 21.12 got underway from Argentia, Newfoundland on the 30th of May. Upon reaching her patrol station in the area 35N, 45W on 1 June, she was in support of westbound Convoy GUS-7A, then rounding the southern end of the "Trutz" line that Doenitz had set up. Captain Short, the Commanding Officer of Bogue and Task Group Commander, had been advised of the existence of Group Trutz by COMINCH in Washington, DC.

The existence of Group Trutz and its location was known through Ultra. The general position and number of U-boats ordered to head for it were also known from message traffic read on 24 May. On that day, traffic was being read currently.⁶ Thus the first sinking of a U-boat directly attributable to Ultra information by the United States Navy was about to take place.

The weather was excellent and Bogue aircraft were sweeping a 120-mile wide path in hopes of hitting the German U-boat patrol line. On 1 June Doenitz shifted the Trutz line south to be in position to attack Convoy GUS-7A. Captain Short was apparently slightly south of the line and this shift put the southern end of the line right in his path. Due to a gap in reading German

traffic between 1 and 4 June, the information as to Doenitz's repositioning of the line was not known at the time it happened.⁷ Washington informed Captain Short of the shift on the 4th of June just as his Avengers sighted and attacked three U-boats. None of these were sunk and it was not until the following day that U-217 was sunk in a coordinated attack by a Wildcat and an Avenger, both from the carrier Bogue.⁸ U-217 was the southern most U-boat of the Trutz Group. No more were located during the next two days.

On 5 June Doenitz ordered the Trutz patrol line cancelled and the submarines were sent north to a refueling rendezvous.

Steaming back and forth in her area of operations searching for more targets, one of Bogue's Avengers spotted U-758 on the surface. U-758 was attacked several times but fought back fiercely. While severely damaged, she was never sunk. The distress message sent by U-758 became very important, in terms of Ultra, as it revealed a refueling rendezvous that was not previously known. This badly upset German U-boat Command's rather intricate plans for refueling and U-boat operations. This intricate plan for transfers of fuel from boats returning from and proceeding to patrol areas involved U-758 bound for the Trinidad area and two refuelers. One of these refuelers, U-118, was subsequently sunk by Bogue aircraft.

U-118 and another refueler, who was to have given extra fuel to U-118, were ordered to U-758's rescue. As a result of this move, valuable intelligence was made available. Up to this time none of the messages involving U-118's position had been decrypted but the message ordering them to the rescue gave the position for which they were to look for U-758. Since the two refuelers had trouble finding U-758, there were several transmissions from the three U-boats on 9 and 10 June. None of these messages were read until 13 June.⁹ However, their transmissions provided DF evidence of U-boat activity.

On 9 and 10 June the Bogue and her escorts stayed with Convoy UGS-9 but broke off and proceeded westward when the convoy was safely under the protection of Morocco based Liberator aircraft. The move to the west by Bogue was in part prompted by the intercepted and DF'ed messages that were the result of U-758's distress caused by Bogue aircraft. Heading west along latitude 30N on 12 June, the group ran smack into the refueling rendezvous of the 1600 tonner U-118. Caught cruising on the surface 20 miles astern of the carrier, the submarine was attacked by seven aircraft and sunk. Seventeen survivors were rescued, including some wounded from U-758.¹⁰ Bogue and her escorts returned to port in Norfolk on 20 June receiving a "Well Done" for these efforts.

The loss of U-118 was far more serious than if she had not been a refueler. Besides the loss of a limited number of these U-boats, there was the immediate effect on the refueling situation in the North Atlantic. The 1600 tonner carried approximately 300 cubic meters (CBM) of fuel for delivery to other U-boats. At the time she was sunk she had not made any deliveries and it was known through Ultra that at least four submarines were to have received about 30 CBM's each from U-118.¹¹ Thus, those submarines plus others were forced to refuel elsewhere or curtail operations and proceed to port. The limited number of refuelers and the intricate way in which they were used is indicative of their value to Doenitz and his entire campaign. The sinking of even one was seriously damaging. Throughout the summer of 1943, the Allies proceeded to destroy virtually all of Doenitz's refueling fleet.

THE GERMAN REFUELER SUBMARINE

After Doenitz pulled his U-boats away from the North Atlantic convoy route, his plan was to use his U-boats in more distant areas. The obvious

lack of success against the convoy system needed to be overcome. Until a way could be found to beat the combination of aircraft and radar, the convoys would have to wait.

Doenitz' plan meant long transits to on-station areas and, if any success was to be forthcoming, long stays in the operating area. In order for this to work, the U-boats would have to be refueled in mid-Atlantic. The area around the Azores was a major refueling area in the summer of 1943.

Doenitz' program for refueling his U-boats was extremely ambitious. Because of stepped up operations in the spring of 1943, three or four refuelers were on station at all times. The remainder were either enroute to or from port or in port for servicing.¹² The margin for losses was obviously slim. Thus, when the US Navy carrier task groups began sinking the precious refuelers, the entire U-boat force was affected. Destruction of the refuelers reduced the standard U-boat to a much restricted operating radius.

Because the refueling fleet was small, great care was taken to protect it. The refueling rendezvous was carefully chosen. The positions were usually picked in mid-ocean well away from convoy routes and outside the range of Allied patrol aircraft. All U-boats approaching a rendezvous were directed to maintain radio silence unless it was absolutely necessary to break it. In addition, combat U-boats were to consider themselves expendable by remaining on the surface to fight while the refueler dove in the event of a surprise attack.¹³

THE SINKING OF U-487

The significance of the sinking of U-487 was far greater than just the loss of a refueler, as critical as that may have been. The loss of this U-tanker affected a whole operation in the East. After the U-boats were

no longer being used to great extent on the North Atlantic convoy route, one of the remaining areas where they could be most useful was the Indian Ocean and Persian Gulf areas. A base in the Far East was a necessity. Such a base was negotiated with the Japanese and the first U-boat arrived at Penang, Malaysia in July of 1943.

The establishment of the supply base at Penang helped bring to fruition a scheme that had been considered for some time. This was the use of U-boats as cargo carriers. Germany's shortage of rubber, tin, tungsten, and molybdenum had forced the Germans to blockade run with surface vessels in order to maintain supplies of these necessary materials. The surface blockade runners were suffering a severe loss rate, however, and this made it clear that another more secure means must be found to transport supplies. This solution involved transport submarines. With the base at Penang needing supplies and Germany needing raw materials, the idea was to carry out a round trip carrying cargo both ways. Some of the boats used in this venture that actually spanned from June 1943 to March 1944 were operational U-boats. During 1943 the most commonly used was the 750-ton type IX-C boat. These U-boats could carry about 110 tons of cargo and also operate enroute if they were refueled. These were the so-called Monsun boats.

During the summer of 1943, 11 Monsun boats left France for the Far East. By the end of August, five had been sunk in mid-Atlantic and one had been forced to return to port. This disaster for the Germans was largely attributable to the sinking of U-487, a 1600-ton refueler, on 13 July. This was the U-boat that was to have refueled the Monsun boats.

The rendezvous area had four US Navy carriers in the vicinity. They were Core, Santee, Bogue, and Card. On the afternoon of 13 July, one of Core's Wildcat-Avenger teams spotted U-487 on the surface. The crew was

pulling a floating bale of cotton aboard and were caught totally by surprise. They reacted quickly, however, and shot down the Wildcat. Three other aircraft arrived immediately on the scene and the U-487 was bombed and sunk quickly.¹⁵

Ultra played a role in this sinking to the extent that bits and pieces of information were put together. First, through Ultra it was known that the area SSW of the Azores was a favorite refueling area. Second, it was known that several U-boats were being sent out from France and thought to be headed for the Far East. Third, it was known that U-487, which was a known U-tanker, had been given instructions to head for that general area. Thus, even though traffic was not at that time being read currently, past Ultra information was instrumental in revealing that a large refueling operation was about to take place.¹⁶

THE SINKING OF U-117

The USS Card, after having taken on fuel in Bermuda and having joined Convoy UGS-13 on 1 August, departed the convoy the following day on hunter-killer operations. On the 3d of August, aircraft from that carrier attacked U-66 which was homeward bound after a long patrol. During the battle the commanding officer of the U-boat was badly wounded. After radioing for assistance that night, the U-boat was ordered by Doenitz to rendezvous with U-117, a 1600-ton refueler. On the morning of 7 August an Avenger from the USS Card sighted the two submarines steaming together about 500 yards apart. The Avenger made one attack and then remained in the area until three more aircraft arrived. U-66 submerged and got away but U-117's afterdeck was severely damaged. Unable to submerge, she was quickly sunk by two Avengers.¹⁷

U-117 was the only U-tanker available during the month of August. The sinking of this U-boat was, therefore, a devastating blow to the refueling system. The necessary rearranging of patrols and refuelings severely curtailed U-boat operations.

Ultra played an instrumental role in this decisive sinking of a U-tanker. In a 30 July message read by OP-20G on 1 August, U-117 had been ordered to stand by in an area within 100 miles of 38-50N, 37-20W. In a 1 August message, read on that same day, the U-tanker was given a more precise position near 37-57N, 38-30W. In another message also on 1 August and also decrypted by OP-20G on the same day, U-117 was ordered to provision U-66 at that position on or after 3 August and after completion to wait in that area. This particular rendezvous was never affected because U-66 could not find the U-tanker. A new rendezvous was ordered by U-boat Command at 38-51N, 38-14W. This information was in message traffic of 6 August which was not decrypted by OP-20G until 14 August.¹⁸ However, based on the previous information the rendezvous area was known well enough for search aircraft to begin looking.

As can be seen, Ultra information was not always perfect and the daily changing Triton code demanded that it be rebroken each time. Apparently some daily codes were harder than others, resulting in gaps and delays in reading German traffic. In the case of the U-117, however, the combination of Ultra and the US Navy airpower at sea were sufficient to sink the only U-tanker Doenitz was able to deploy in the month of August.

THE END OF SUMMER

Besides the particular sinkings described in this chapter, there were many others throughout the summer. Particularly bad months for Doenitz were July and August. During these two months 62 U-boats were sunk by Allied

forces. Thirty-five of these were sunk by US forces and 6 of the 10 sunk in August were sunk by the USS Card and USS Core task groups.

The high number of sinkings must have been having a terrible effect on the morale of the U-boat force. Because of the methods used by U-boat Command to control his submarines, a lot of message traffic had to be sent. It hardly seems likely that these losses could be kept out of traffic, particularly with the shifting around of refueling operations and patrols caused by the loss of the U-tankers.

By the end of August there were only 40 operational U-boats at sea as compared with some previous months in the war when the numbers were as high as 120. Of those at sea in August the majority were homeward bound, their cruises shortened by lack of a place to replenish, or outward bound on a fore-shortened cruise limited by onboard fuel.¹⁹

Not all of the credit can go to Ultra for the relatively happier situation the Allies were experiencing at the end of the summer of 1943. Much credit must be given to Admiral King for organizing the Tenth Fleet in the first place. Without that organization, US Naval forces would not have had the flexibility they enjoyed which greatly facilitated operations. Because Tenth Fleet was designated as a fleet and given all of the power attendant thereto, it could act quickly and across command lines in placing forces where they were most needed or could be the most effective. Obviously, the Navy did not have sufficient forces that they could be left to sit idle in one area while another area went without sea power.

Another major factor, as is probably evident by now, was the formation of the Hunter-Killer Task Groups formed by an escort carrier and her escorts of DE's and DD's. Because they were given the flexibility to depart from convoy escort operations and allowed to hunt on their own, they could be where

the action was. The combination of the air power now brought to bear in mid-Atlantic and particularly at the rendezvous areas, with Ultra information supplied by OP-20G, created a force that severely damaged the German U-boat arm.

THE SUBMARINE REFUELING FLEET			
U-Boat Number	Type	Month of First Operation	Month Sunk
116	XB	Spring 1942	Dec 1942
117		Oct 1942	Aug 1943
118		Sept 1942	June 1943
119		Feb 1943	June 1943
219	XB	Oct 1943	--
220		Sept 1943	Oct 1943
233	XB	May 1944	July 1944
234		April 1945	--
459	XIV	April 1942	July 1943
460		July 1942	Oct 1943
461		June 1942	July 1943
462		Sept 1942	July 1943
463		Aug 1942	May 1943
464		Aug 1942	Aug 1942
487		Mar 1943	July 1943
488		May 1943	April 1944
489	July 1943	Aug 1943	
490	XIV	May 1944	June 1944

Type XB: Combined minelayer and supply boat.
2 torpedo tubes. Fuel capacity, 426 CBM's.

Type XIV: Supply only. Fuel capacity, 740 CBM's.

Above excerpted from World War II OP20G Final Report Series on the Battle of the Atlantic, US Navy.

Table 1

CHAPTER III

FOOTNOTES

1. Rear Admiral Julius Augustus Furer, Administration of the Navy Department in World War II, pp. 159-160.
2. Ibid., p. 160.
3. Walter Karig, Battle Report, The Atlantic War, p. 95.
4. Samuel Eliot Morison, History of United States Naval Operation in World War II, Volume 10, p. 40.
5. Ibid., p. 42.
6. US Navy, World War II OP-20G Final Report Series on the Battle of the Atlantic Volume II, p. 105.
7. Ibid., p. 105.
8. Morison, p. 110.
9. US Navy, p. 136.
10. Morison, p. 114.
11. US Navy, p. 140.
12. Ibid., p. 120.
13. Ibid., pp. 121-122.
14. Ibid., p. 367.
15. Morison, p. 118.
16. US Navy, p. 377.
17. Morison, p. 377.
18. US Navy, p. 154.
19. Ibid., p. 158.

CHAPTER IV

THE FINAL MONTHS

After the summer of 1943, the German U-boat force was no longer a menace. Unable to resupply at sea, Doenitz' submarines were severely limited in their flexibility of operations but the undaunted German U-boat Command fought back as Doenitz mustered his boats to renew the battle on the convoy lanes.

ULTRA CONSISTENTLY CURRENT

Although the renewed campaign against the convoys met with some success in the fall of 1943 it was short lived. The Germans were never able to put the numbers of boats to sea that they had earlier in the war. Groups of 21 boats, 13 boats and less sailed from Lorient, France that fall.

The U-boat force had devised some new tactics and new weapons with which they hoped to have success. A new acoustic torpedo was available and great things were expected. Further, with this improved weapon, the tactic was to shoot the escorts and then close in on the merchant ships.

Two major factors, along with the always present radar equipped aircraft, defeated this attempt. First, the new acoustic torpedo was countered by FXR or "Foxyer," which was a noise generator streamed behind the escort vessels. Secondly, Ultra was constantly available. German messages on the Triton circuit were being decrypted quickly and currently. After several months of difficulty in the summer, where there were sometimes gaps of days, the German system had been mastered.¹

With timely, current information as to the locations of the U-boat lines, the convoys could quickly be rerouted to avoid them. This was a far easier task than it would have been earlier in the war. In some months of 1942, a

rerouting of a convoy to avoid a wolf pack might easily route it into the midst of another U-boat group. At the stage of the war in the fall of 1943, Doenitz could not put enough submarines at sea for this to be a real problem. In addition, Ultra was providing good information, the dispositions, and numbers of boats at sea were probably known with fairly good accuracy.

In the last months before the invasion of France the German U-boat Command made a valiant effort to cut the Allied supply and troop build-up. During those last months, Doenitz kept an average of 60 U-boats per month at sea. During the last seven months before the invasion, the U-boats sank 19 allied ships. The cost was excruciating, however, as 50 combat U-boats and 2 refueler U-boats were sunk.² The German Navy by then had some snorkel equipped submarines but it was too late. They made no decisive impact on the Battle of the Atlantic.

AFTER D-DAY

The German Navy fought on after the invasion of France but was never able to cause much damage to the Allied effort. Forced out of France and into Norway and then subsequently forced out again, the U-boat fleet could not muster the power to even again be a force at sea. The U-boat, at this point, was no longer a menace but remained a problem right up until the end of the war.

The Allied strength was not to be overcome even though Doenitz had a bigger and better submarine fleet than existed at the beginning of the war or even during some of the worst months of 1942. The fact is that Allied sea power and air power was just overwhelming for the German U-boat. At the beginning of the war the German U-boat spent the majority of its time at sea on the surface. By the summer of 1943 and thereafter, a U-boat spent the

majority of a cruise submerged. This was not by choice, but because to surface meant constant danger. The land based aircraft and the air power provided by the CVE kept them down. Consequently in the last days of the war, going to sea in a U-boat was a dangerous undertaking.

THE CAPTURE OF U-505

Ultra played no decisive part in the capture of the U-505, but it could have been affected by it. Fortunately, the secret of its capture was kept until the end of the war.

On 4 June 1944, the CVE Guadalcanal, with Captain Dan Gallery in command along with his four destroyer task group, surfaced the U-505 150 miles due west of Cape Blanco, French West Africa. The idea of such an undertaking had been in Captain Gallery's mind for some time and in fact, boarding parties had been previously organized and trained.³ The story of this capture is in itself an exciting episode in the Battle of the Atlantic and is best told by Admiral Gallery in his book, Twenty Million Tons Under the Sea. After its capture, the U-505 was taken successfully under tow and towed to Bermuda. The crew was held there until the end of the war. The capture needed to be kept secret because, along with the boat itself and whatever other German naval secrets may have been on board, an Enigma machine and current code books were taken. Those that did not know we had Ultra but knew of the capture surmised that at least from that point on the United States was reading operational U-boat traffic from then until the end of the war. Fortunately, Captain Gallery and his entire command of some 3000 men kept the U-505 capture secret until the war was over.⁴

THE FINAL DAYS

The consistent solid reading of German U-boat traffic continued until the very end. In the final weeks it is doubtful that the Allies could have been stopped, with or without Ultra.

On the other hand, the U-boat arm of the German Navy was not beaten. Even though they may no longer have been an effective force as they once were relative to the Allies, they were still at sea, still operational and willing to fight. At the end, Doenitz had 336 U-boats and all were willing to fight. At the very end 215 submarine skippers scuttled their boats rather than surrender them.⁵ Clearly the German U-boat arm was not defeated at sea. They very nearly won the Battle of the Atlantic and had the war been longer, may have again dominated the sea lanes with snorkel boats and newer weapons.

Losses on both sides in the Battle of the Atlantic were terrible. As many as 70,000 people lost their lives on both sides of the struggle to control the Atlantic Ocean. If Ultra helped the figure to be lower than it might have been, then it must be counted as a successful effort.

THE TONNAGE BATTLE

Year	German U-boats Sunk (Number)	Allied Shipping Sunk	New Construction			Net Gains or Losses
			U.S.	British	Total	
		(In thousands of tons)				
1939 (4 months)	9	810	101	231	332	-478
1940	22	4,407	439	780	1,219	-3,188
1941	35	4,398	1,169	815	1,984	-2,414
1942	85	8,245	5,339	1,843	7,182	-1,063
1943	237	3,661	12,384	2,201	14,585	+10,974
1944	241	1,422	11,639	1,710	13,349	+11,927
1945 (4 months)	153	458	3,551	283	3,834	+3,378
TOTALS	782	23,351	34,622	7,863	42,485	+19,134

The above table is an excerpt from US Navy at War 1941-1945: Official Reports to the Secretary of the Navy, by Fleet Admiral Ernest J. King. Washington, DC, United States Navy Department, 1946, p. 206.

Table 2

CHAPTER IV

FOOTNOTES

1. US Navy, World War II OP-20G Final Report Series on the Battle of the Atlantic Volume II, p. 169.

2. Ibid., p. 184.

3. Rear Admiral Daniel V. Gallery, Twenty Million Tons Under the Sea, pp. 275-277.

4. Ibid., pp. 307-308.

5. Ladislav Farago, The Tenth Fleet, p. 289.

CHAPTER V

CONCLUSION

It is without doubt valid to state that Ultra was to some degree an effective tool for the Allies in the Battle of the Atlantic. Whether or not the war was shorter because of it can only be speculated.

Had it not been for the British and the fact that they were involved against the U-boat long before the United States entered the war, progress toward ultimate victory would have been far slower. Without a doubt the capture of the Enigma machine from U-110 by the British was the big break in Ultra in the early war years. The British efforts at Bletchley Park and at the Admiralty Tracking Room gave the United States a head start in organizing at COMINCH and must have influenced the internal workings of OP-20G.

The cooperation that was evident at all other levels and in all other endeavors between the United States and the British during the war must have existed between OP-20G and Bletchley Park. No evidence to substantiate the degree of cooperation was found during this research. It is known that a secure link via trans-Atlantic cable existed between the Admiralty Operations Intelligence Center Tracking Room and COMINCH Combat Intelligence Atlantic Section. Each of these tracking rooms was securely linked with their own code breakers respectively. Thus, the communication links were available for tremendous amounts of cooperation. Moving convoys and sinking submarines are not simple tasks under the best of circumstances and it would appear logical that the greater the cooperation between the Allies, the better. Agreement on the locations, numbers and dispositions of the U-boats would facilitate coordinated efforts to sink them. It would not appear logical to no longer

worry about a convoy because it had crossed the "chop" line into another country's responsibility area. Therefore, it must be assumed that agreement was reached at all levels, at least in a general way, as to the numbers and operating area of the U-boats.

Cracking the Triton code obviously gave the Allies some difficulties. It took ten months to do it and even then, large gaps and time delays were encountered in reading the traffic. As was seen, even if the basic cypher is broken, daily or periodically changing codes can cause difficulties in decryption. However, the Allies by the fall of 1943 had the system solidly in hand and read the U-boat message traffic currently the remainder of the war.

Ultra was as effective a tool as it was because of a conscious decision taken by Admiral Doenitz. In prosecuting the war with his submarine force he decided that the U-boat command ashore would control every event. This tight control was only possible by high frequency radio and this was his weak point. High frequency radios designed to transmit long distances omnidirectionally can be received by anyone with a receiver tuned to the right frequency and within range. In this case, that was both sides of the Atlantic Ocean.

Doenitz did not have a Wolf Pack Commander at sea who was allowed to run the group tactics. All attacks on the convoys were directed from the Headquarters ashore. Doenitz was relying on the experience possessed by him and his staff.

Any scheme of detailed direction from command ashore to units at sea requires the commander to have massive amounts of detailed knowledge which must be constantly updated. This means lots of high frequency radio traffic going both ways. This was the success of Ultra and the failure of Admiral

Doenitz. He may have suspected that his messages were being read by the Allies, but he must not have been convinced as he did nothing about it.

Ultra was closely held by the Allies, and even among the higher levels in both the Admiralty and COMINCH headquarters only a few people were aware of its existence. The United States perhaps used it more boldly than the British but there were always other sources that could account for the Allies' knowledge. For example, even the drubbing that the Hunter-Killer groups gave the U-tanker system could be rationalized. HFDF, though not terribly accurate, could proscribe an area small enough that it could be searched by aircraft, if you had enough available. In the case of some of the supply and refuel rendezvous, there was more than one carrier in the area. Thus there was usually sufficient radar equipped aircraft to cover fairly large ocean areas. Further, the German intelligence service seems to have been extremely recalcitrant about seriously considering that the German encryption system could be broken.

OBSERVATIONS AND RECOMMENDATIONS

Ultra and the Battle of the Atlantic provide us with an historical example that should be used to guide our thinking today. Anti-submarine warfare is among the more serious and complex forms of warfare. This was true in World War II and is still true today.

The Battle of the Atlantic took three forms in World War II that can provide lessons for study that have applications to the modern world. These three forms, or battle modes, were the Intelligence/tactical battle, the technological battle, and superiority of forces battle.

The first of these, the Intelligence/tactical battle, includes the use of Ultra by the Allies and the use of decrypted convoy traffic by the Germans.

With this information the Allies sought to reroute merchant vessels and Doenitz sought to intercept them. The Allies used Ultra to sink German submarines wherever they could as long as some other source could conceivably account for the information.

In today's world, while perhaps intelligence/tactical systems are more sophisticated, they can and must be used to counter the enemy submarine force. As it was in World War II, anti-submarine warfare starts with knowledge of the location, disposition and deployments of the other side's submarine force. The fact that the Soviet submarine force is large and mostly nuclear powered does nothing to change that fact. If we propose to counter the Soviet submarine force, then that knowledge, no matter how obtained, is necessary.

The tactical part of this battle mode applies to the way in which Doenitz employed and directed his submarine force. The direct, tight control from his headquarters was a mistake. Had he used his Commanders at sea, and allowed them to operate with greater flexibility, the results might have been different. Shorter range radios were available and the U-boats were equipped with them. Had he taken advantage of this, the amount of Ultra information available to the Allies would have been severely reduced. If the Soviets have a tendency to over-control from the Kremlin, we should do nothing to discourage them.

As an aspect of the tactical battle, the United States gave its hunter-killer groups great flexibility. They were allowed to roam and actively search out the enemy. This faith in their commanders at sea is a tribute to the leadership of Admiral King and his Commanders ashore. The lesson of trust in the man on the scene, a willingness to delegate and not over-control, is a lesson in leadership that is best not forgotten. It worked for the Navy in World War II and can work for the Navy today.

The technological aspect of the Battle of the Atlantic resulted in an explosion of submarine warfare and anti-submarine warfare equipment. Acoustic torpedoes, snorkels, micro-wave radar mounted in aircraft, sonobuoys, magnetic anomaly detection, ECM gear to name some, were all an outgrowth of the technology battle in the Atlantic. Each side was constantly scrambling to counter the other side's technological innovations. It is not clear where this would have ended had the war lasted another year or so. The Germans were well along in snorkel technology and had some excellent torpedoes.

The lesson that must be kept in mind is the fact that for every technological achievement in submarine and anti-submarine warfare thus far, there is or can be devised something to help counter it. Acoustical technology has grown up with the nuclear submarine. The United States must be prepared to stay in the technology race for the duration. Admiral Doenitz did terrible damage during the war and he started with a very small, very limited capability force. The Soviet Union submarine force is large, nuclear powered and extremely capable. The technological counters must be constantly pursued.

The superiority of forces battle leaves clear lessons to remember. Early in the war, the German U-boat force controlled the Atlantic Ocean. They operated wherever they wanted with virtual impunity. As the war progressed and the Allies began to build their forces, things began to change. By the summer of 1943 the Allies controlled the Atlantic. The hunter-killer groups operated whenever they wanted with virtual impunity. Clearly if one intends to win a war at sea, a superiority of forces is essential.

Today the Soviet submarine force can range worldwide. With nuclear power its range and duration is virtually without limits. US Navy anti-submarine forces must be enhanced if all ocean areas that must be covered can be covered. Patrol aircraft do nicely in the North Atlantic and North Pacific because

operational bases exist; but this is not true for the South Atlantic and Indian Ocean areas.

The small hunter-killer group concept worked extremely well in World War II. There is no reason why it could not work just as well in today's world. Small carriers with escorts, all dedicated to anti-submarine warfare, could be employed in any ocean area. With hunter-killer groups anti-submarine air power would be brought to bear in the South Atlantic and Indian Ocean areas. These areas are crucial to the United States and our Allies as most of the world's oil is transported across them. Hunter-killer groups at sea are the necessary counter to operation of the Soviet submarine force in these areas. The US Navy does not now possess such dedicated groups. The only at sea ASW air power is aboard the large deck CV's. Because of other missions that these carriers must fulfill they cannot be dedicated solely to the role of anti-submarine warfare. The United States must not ignore the role that a hunter-killer group concept can play in the future battle for superiority of forces in the world's ocean areas.

BIBLIOGRAPHY

- Beesly, Patrick. Very Special Intelligence: The Story of the Admiralty's Operational Intelligence Centre 1939-1945. London: Hamish Hamilton, 1977.
- Farago, Ladislas. The Tenth Fleet. New York: Ivan Oblensky, Inc., 1962.
- Farer, Julius Augustus, Rear Admiral, USN (Ret). Administration of the Navy Department in World War II.
- Gallery, Daniel V., Rear Admiral, USN. Twenty Million Tons Under the Sea. Chicago: Henry Regnery Company, 1956.
- Hughes, Terry and Costello, John. The Battle of the Atlantic. New York: Dial Press, 1977.
- Karig, Walter, Commander, USNR, et al. Battle Report: The Atlantic War. New York: Farrar and Rinehart, Inc., 1946.
- King, Ernest J., Fleet Admiral, USN. US Navy at War 1941-1945: Official Report to the Secretary. Washington: United States Navy Department, 1946.
- Lewin, Ronald. Ultra Goes to War: The First Account of World War II's Greatest Secret Based on Official Documents. New York: McGraw Hill, 1978.
- Morison, Samuel Eliot. History of United States Naval Operations in World War II Volume X: The Atlantic Battle Won May 1943-May 1945. Boston: Little, Brown, 1956.
- Rohwer, Jurgen. The Critical Convoy Battles of March 1943: The Battle for HX.229/SC122. Annapolis: Naval Institute, 1977.
- World War II OP-20G Final Report Series on the Battle of the Atlantic, Volume I and Volume II. United States Navy, Xeroxed, 1945.