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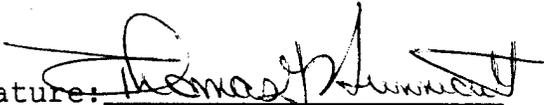
THE OPERATIONAL FAILURE OF U.S. SUBMARINES
AT THE BATTLE OF MIDWAY -
AND IMPLICATIONS FOR TODAY

by

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A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: 

FOIC QUALITY INSPECTED 4

March 1997

Paper directed by Captain G. W. Jackson, USN
Chairman, Joint Military Operations Department

19960813 113

REPORT DOCUMENTATION PAGE

1. Report Security Classification: UNCLASSIFIED			
2. Security Classification Authority:			
3. Declassification/Downgrading Schedule:			
4. Distribution/Availability of Report: DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.			
5. Name of Performing Organization: JOINT MILITARY OPERATIONS DEPARTMENT			
6. Office Symbol: C		7. Address: NAVAL WAR COLLEGE 686 CUSHING ROAD NEWPORT, RI 02841-1207	
8. Title (Include Security Classification): THE OPERATIONAL FAILURE OF U.S. SUBMARINES AT THE BATTLE OF MIDWAY - AND IMPLICATIONS FOR TODAY (U)			
9. Personal Authors: THOMAS G. HUNNICUTT, CDR USN			
10. Type of Report: FINAL		11. Date of Report: 20 MAY 1996	
12. Page Count: 30			
13. Supplementary Notation: A paper submitted to the Faculty of the NWC in partial satisfaction of the requirements of the JMO Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.			
14. Ten key words that relate to your paper: operational art, operation, submarine, Midway, training, doctrine, fleet, exercises, CINC.			
15. Abstract: U.S. submarine operational failure led to tactical insignificance at the Battle of Midway. This was a remarkable outcome since interwar U.S. policy, submarine design, and fleet exercises dictated fleet support by submarines. From today's view this failure is neither unique to a platform nor specific to an operation. It can and does cross all services. The operational failure at Midway resulted from the failure to abide by the operational art factors of synergy, simultaneity and depth, anticipation, and leverage. These were compounded by failure to provide adequate C3I system operational support. These failures were a consequence of the submarine force, and the Navy, not adequately addressing and training on operational art during the interwar years. Today, Navy doctrine and training still have not adequately addressed operational art though it is an essential part of joint warfare. The present use of exercises designed only to test and build tactical proficiency of air, land, or sea forces risk the same type of operational failure in future wars. Suggestions on developing operational art proficiency through innovation as a function of today's forces, budgets, and training technology are presented for consideration.			
16. Distribution / Availability of Abstract:	Unclassified X	Same As Rpt	DTIC Users
17. Abstract Security Classification: UNCLASSIFIED			
18. Name of Responsible Individual: CHAIRMAN, JOINT MILITARY OPERATIONS DEPARTMENT			
19. Telephone: 841- 6461 6461		20. Office Symbol: C	

ABSTRACT

U.S. submarine operational failure led to tactical insignificance at the Battle of Midway. This was a remarkable outcome since interwar U.S. policy, submarine design, and fleet exercises dictated fleet support by submarines. From today's view this failure is neither unique to a platform nor specific to an operation. It can and does cross all services.

The operational failure at Midway resulted from the failure to abide by the operational art factors of synergy, simultaneity and depth, anticipation, and leverage. These were compounded by failure to provide adequate C3I system operational support. These failures were a consequence of the submarine force, and the Navy, not adequately addressing and training on operational art during the interwar years.

Today, Navy doctrine and training still have not adequately addressed operational art though it is an essential part of joint warfare. The present use of exercises designed only to test and build tactical proficiency of air, land, or sea forces risk the same type of operational failure in future wars. Suggestions on developing operational art proficiency through innovation as a function of today's forces, budgets, and training technology are presented for consideration.

The Operational Failure of U.S. Submarines at the Battle of Midway - and Implications for Today

Introduction

"Operational Art--The employment of military forces to attain strategic and/or operational objectives through the design, organization, integration, and conduct of strategies, campaigns, major operations, and battles. Operational art translates the joint force commander's strategy into operational design, and, ultimately, tactical action, by integrating the key activities at all levels of war."¹

U.S. submarine operational failure led to tactical insignificance at the Battle of Midway. This was a remarkable outcome since interwar U.S. policy, submarine design, and fleet exercises dictated fleet support by submarines. From today's view this failure is neither unique to a platform nor specific to an operation. It can and does cross all services.

Naval Doctrine, Strategy, and the Fleet Submarine: 1911-1941

To appreciate the operational failures at the Battle of Midway, as well as lay the foundation for their implications for today, a review of interwar U.S. Naval history as it relates to submarines is essential. Submarine operations at Midway were not new missions, but missions developed over twenty years. These missions were diligently trained on by the submarine force and tactically the submarine force was proficient in these missions by the time of the Battle. Operational art proficiency was another matter.

As early as 1911, the Navy began consideration of a fleet submarine--a submarine capable of operating with the battle fleet, at battle fleet speed, and over trans-oceanic distances.² "Conceived as an auxiliary to the battleship, the fast fleet submarine conformed to the ideas of Alfred Thayer Mahan, the strenuous advocate of concentrating force with a view to a decisive engagement with the enemy fleet."³ Fleet submarine missions in direct (meaning close) support of the battle fleet were envisioned as scouting, forming screens through which the enemy fleet would have to pass, and attacking enemy warships in concert with the battle fleet.⁴ While the technology did not exist in 1911 to satisfy these requirements, the Navy commenced a submarine development and building program (which did provide the true fleet submarine in the late 1930s). Concurrently, training of submarine crews on direct support of the battle fleet began and evolved with each new class of submarines even as the battle fleet support mission evolved with Plan Orange, the war plan against Japan.⁵

The continued evolution of the battle fleet support mission was one set by treaty and U.S. Government policy as well as submarine capability. After World War I the revulsion of the U.S. Government to the unrestricted guerre de course conducted by German U-boats effectively removed guerre de course as a mission.⁶ This was codified by the submarine warfare rules established in the 1922 Washington Naval Treaty,

the 1930 London Naval Treaty, and the generally observed London Protocol of the 1936 London Conference.⁷ This outlawing of the unrestricted guerre de course mission allowed the U.S. submarine force to concentrate on its fleet support mission.⁸

As the battle fleet technically advanced and added new platforms (aircraft carriers), War Plan Orange changed in response. Consequently, the submarine support mission evolved. In 1928 a proposal for submarine **independent** operations in support of the battle fleet rather than the direct support role was submitted to the Navy's General Board by the Navy's director of war plans.⁹ The proposal recognized that a submarine tied closely to the fleet would compromise to varying degrees the submarine's most potent capability: its stealth.¹⁰ This subsequently was the subject of a 1930 letter from the President of the Naval War College to the Secretary of the Navy which advocated the submarine mission of independent offensive operations against enemy warships as well as the previous missions of scouting and operating in conjunction with the battle fleet.¹¹ The 1934 memorandum implementing the latest revision of War Plan Orange identified the submarine missions as operating against enemy fleets in support of the battle fleet, reconnaissance of enemy harbors, and defending Pearl Harbor. The 1936 revision repeated these

missions--missions which the submarine force continued to exercise with the battle fleet.¹²

By 1939 submarine doctrine specifically stated: "The primary task of the submarine is to attack enemy heavy ships. A heavy ship is defined as a battleship, a battle cruiser, or an aircraft carrier. On occasions, the primary task may, by special order, be made to include heavy cruisers, light cruisers or other types of ships."¹³ Simultaneous with this doctrine was the building of the true fleet submarine, the Tambor class. The Tambor and all subsequent classes provided the capability to meet all design and mission requirements of the fleet submarine.¹⁴ The submarine mission of War Plan Orange, the plan to which the submarine force had trained and exercised for two decades, was now fully executable.¹⁵

In May 1941 with the implementation of War Plan Rainbow Five, the latest revision of War Plan Orange, submarines were removed entirely from the direct support of the battle fleet. They had become independent hunters tasked with reconnaissance of Japan, attacking enemy capital ships, and performing special missions.¹⁶ Tactically this had no impact. Operationally, it revealed a serious failure: the requirement in Rainbow Five, and War Plan Orange before, for up to 75 day, long range combat patrols had never been tested.¹⁷ This was the first indication of operational failure related to the true fleet submarine and war plans. This failure foreshadowed

the submarine force operational failures to come at Midway. There, well trained crews on capable fleet submarines executed well understood tactical missions--but operational commanders ashore poorly understood and exercised operational art as it related to those submarines.

Submarine Operational Failure at the Battle of Midway

While the Battle of Midway is well known with respect to the carrier actions a brief synopsis of submarine actions, fleet command structure, and assigned mission is necessary. In all 12 U.S. submarines were present in the battle area. Of these eight were new fleet submarines of the Tambor or follow-on Gato classes. The remaining four were of older, technically obsolete classes.¹⁸ In the same area were 98 Japanese warships and major auxiliaries, including four carriers, three light carriers, seven battleships, ten heavy cruisers, 11 oilers, and 15 troop transports.¹⁹ During the battle, U.S. submarine action amounted to: (1) sighting of one oiler early on 4 June 1942 with subsequent loss of contact after submerging for daylight, (2) attacking a burning carrier in which the one torpedo to hit was a dud, (3) causing a collision between two heavy cruisers (Mikuma and Mogami) after being sighted on the surface (no weapons fired), and (4) sending a vague warship sighting report which led Rear Admiral Raymond A. Spruance, Commander Task Force 16, to break off

from his pursuit of retiring Japanese forces.²⁰ "The role played by U.S. submarines in the Battle of Midway was one of confusion and error."²¹

The Commander-in-Chief (CINC) for the U.S. forces in the Battle of Midway was Admiral Chester W. Nimitz, CINC U.S. Pacific Fleet and Pacific Ocean Areas, headquartered at Pearl Harbor. For the Battle of Midway Admiral Nimitz established a chain-of-command in which task force and component commanders reported directly to him in order to coordinate the air, land, and sea forces. These included carrier forces, all land, air, and naval forces on Midway Island, and all submarines. For submarines Nimitz commanded through his submarine component commander, Rear Admiral Robert H. English, Commander Submarine Force Pacific Fleet (COMSUBPAC), also headquartered at Pearl Harbor. As the submarine component commander Rear Admiral English was designated as Commander, Task Force SEVEN. Submarine operational control (OPCON) was maintained by Rear Admiral English.²²

The submarine mission at Midway was concise: "inflict maximum damage to [the] enemy."²³ This was not accomplished due to operational failures by the CINC and COMSUBPAC. Lest this appear too critical of personalities, these failures did not necessarily result from Nimitz, English, and their staffs. The failures were a consequence of the submarine force, and the Navy, not adequately addressing the facets of operational

art during the interwar years.

While the term "operational art" was not part of Navy policy or doctrine before or during World War II the concept and characteristics of operational art have existed since large scale warfare began. As such, the submarine operational failures at Midway will be analyzed in terms of the characteristics of operational art as defined in present joint operations doctrine.²⁴ However, it would be irrelevant to analyze for operational failure in the context of today's command structure, technology, and command, control, communications, computers, and intelligence (C4I) systems. Analysis will be in the context of 1942 capabilities. While the particulars of the failure are a unique product of the time, the failure as it relates to the set characteristics of operational art are transportable. They are meaningful in the present. Analysis will remain at the operational level of war focussing on the CINC and COMSUBPAC. Actions by submarines will be addressed only as a manifestation of the operational failure, as such actions are normally tactical in nature.²⁵

The failures were in the operational art characteristics of synergy, simultaneity and depth, anticipation and leverage. These were compounded by failure to provide adequate command, control, communications, and intelligence (C3I) system operational support.

Synergy refers to the integration and synchronization of

operations to apply force from different dimensions. The placement of submarines at Midway and poor command and control by the CINC and COMSUBPAC precluded their massing to attack in concert with Midway based and carrier based aircraft. As they were stationed on long arcs of 200 mile and 150 mile radii from Midway they could have supported air attacks if C3I had provided cueing or vectored the widespread submarines to the action in sufficient time.²⁶ This was possible based on the lead time given by long range Midway based aircraft and their near continuous scouting patrols. Of course, better placement of the arcs further out would have reduced submarine transit time as well as allow the submarines to attack and disrupt the force before the arrival of U.S. aircraft.²⁷ In any case, submarines were not required by COMSUBPAC directive to monitor aircraft clear voice radio circuits before 0730 each day, and likely had not been issued the code to monitor aircraft secure transmissions.²⁸ In either case, the CINC and COMSUBPAC did not turn around scout aircraft reports to the submarines in a timely manner. Delays of two hours to twelve hours were typical. Such delays, given submarine and Japanese fleet speeds, effectively took most submarines out of the fight.²⁹

Simultaneity and depth refers to the near simultaneous attacking of an opponent's entire structure. In addition to the submarine arcs a lone submarine was positioned at the expected rendezvous point of the Japanese invasion fleet

approximately 700 miles west of Midway. By attacking the invasion fleet just prior to the air attack on the Japanese carrier strike fleet, significant strategic and operational uncertainty would have entered the Japanese calculations as well as potentially depleting the landing force. Again, this opportunity was missed by COMSUBPAC delaying the report of the sighting of the invasion group by twelve hours. Again, the submarine not having been issued the aircraft codes precluded it from monitoring. The sighted position allowed an attack. Twelve hours later the invasion group was out of range.

Anticipation and Leverage. Anticipation refers to being alert for opportunities to exploit as well as the unexpected. Leverage refers to maintaining and exploiting advantages in all dimensions. After the devastating U.S. air attack on the four Japanese carriers a opportunity to converge on the scene of battle by at least half of the arc submarines presented itself. The CINC and COMSUBPAC knew of the large number of surface forces, including the possibility of other carriers, in the area. It would be expected that these would converge on Vice Admiral Nagumo and his remaining forces to render aid.³⁰ Warships converging and slowing to render aid make fat, overlapping targets for submarines. However, instead of taking advantage of the situation the CINC and COMSUBPAC withdrew **all** submarines to a 100 mile radius arc (station time

no later than dawn; 5 June) then to a five mile radius arc (directed at 0609, 5 June) of Midway because it was concluded the invasion would still occur. An irony of Midway is that it is remembered as an triumph of intelligence. It was a triumph of strategic intelligence through the partial breaking of the Japanese code and the brilliant analysis by the codebreakers. It was not a triumph of operational intelligence. Collection, collation, and analysis of battle area scouting reports and other intelligence reports were inadequate. Long range aircraft scouting at dawn on 5 June observed all Japanese forces heading west. The CINC and COMSUBPAC failed to recognize this general retreat.³¹ This, coupled with six to twelve hour delays in turning around intelligence and directives to submarines, took the submarines out of the battle area again on 5 June as it had on 4 June.

This failure of operational intelligence and communication also resulted in one submarine report causing Rear Admiral Spruance to detour to Midway early on the morning of 5 June vice continuing west to engage the Japanese. At 0215 USS Tambor transmitted a vague contact report after sighting a number of unidentified ships approximately 100 miles west of Midway. This report was not receipted by Midway until 0306 and not received by COMSUBPAC until 0400. Rear Admiral Spruance, on receiving the report, turned his carriers toward Midway at 0420 and steamed in that direction until

about 0930.³² At 0609 COMSUBPAC directed all arc submarines to within 5 miles of Midway. This was done despite Midway search planes, which had been searching since 0415, having reported no Japanese forces in the vicinity of Midway and all observed Japanese forces were heading west. While the Tambor's vague report triggered the redeployment of submarines and a carrier task force to a spot barren of combat, the CINC and COMSUBPAC C3I system failed to prevent it. The system was unable to integrate and analyze the report in terms of the sighted ships' identity or to other data, especially the search planes' reports.

The operational failure of U.S. submarines at Midway took the CINC, a submariner, as well as the submarine force by surprise. Over twenty years of doctrine and training had not produced combat results close to the expectations derived from numerous peace time fleet exercises, even with the modern fleet submarine. Obviously, tactical proficiency was not enough. The failure was the consequence of the Navy training to produce tactical proficiency, while not considering operational art and its implications. A force cannot be expected to do well in an area it has not trained in. Tactical proficiency levels within an exercise are relatively easy to grade. Measures of effectiveness abound. Operational proficiency--how is that to be evaluated considering the huge forces involved? But the lesson of the submarine force at

Midway was not that numbers mattered, but that the ability to think operationally and to correctly apply the characteristics of operational art were what mattered at the CINC and component commander level. It was clear from Midway that tactical proficiency did not mean operational proficiency. The two were unique and required a change in how the Navy was trained and evaluated.

Implications for Today

The specifics of the Battle of Midway, including the particular violations of operational art by the submarine force, will not be repeated in future conflicts--too many things have changed and continue to change. However, the potential for failure in battle whether at the tactical, operational, or strategic level will always remain. Training and exercise remain the key measures in peace time to prevent mistakes in combat. But, are the Unified Commands, the Specified Commands, and the Navy training at the operational level today--and is that training effective?

Today operational and tactical proficiency is defined and measured through the concept of readiness. Joint readiness is the measure of proficiency in operational art at the combatant commander's (CINC's) level. Unit readiness is the measure of tactical proficiency of a service unit as measured through the unit status. "... readiness, from the perspective of CJCS

[Chairman, Joint Chiefs of Staff], is defined as the synthesis of readiness at the operational and tactical levels."³³

Joint training at the operational level is accomplished through the CINC's Joint Mission Essential Task List (JMETL). The JMETL is derived from the Universal Joint Task List (UJTL) as modified by the CINC's mission from the Joint Strategic Capability Plan (JSCP), joint doctrine, and the CINC's concept of operations. Each essential task will include conditions (environmental variables that effect the task) and **standards** (specific measures of effectiveness for that task).³⁴

With respect to the operational failure at Midway, today there are enforced differences that give a measured confidence that operational failures, of any variety, will not be repeated. At the CINC level there are standards. There is also the Joint Warfighting Center (JWFC).

The JWFC designs and executes operational level exercises to evaluate the CINC and his staff in their meeting the standards of the CINC's JMETL. As part of execution the JWFC can provide an opposing force (OPFOR) commander who plays to win in a free play (non-canned) mode. Lessons learned from such operational level exercises are provided to the other CINCs and services via the Joint Universal Lessons Learned System (JULLS).³⁵ Thus the operational level joint training program provides clearly identified requirements, standards to

determine if the training program is providing forces to meet those requirements, and an honest broker in the JWFC to run the exercises and provide an impartial evaluation.

However, there are problems with the concept. A review of JULLS indicates the majority of lessons learned either border on the tactical, are concerned with staff through-put, or are bean counting. The effectiveness of operational level training must be a function of the quality of the decisions made. It is that function which the JWFC OPFOR, it is supposed, addresses. An OPFOR trying to win in a free play mode very quickly determines the quality of joint staff decisions: the joint staff either wins, loses, or fights to a draw. The former is good. The latter two are less desirable. However, a review of JULLS is not revealing of this process. It may be because this training scheme is new and the database, as well as OPFOR experience, is building. On the other hand, the OPFOR may not be able to bring to bear on the staff in these exercises a stress, tempo, and confusion factor emulating combat operations. There are answers.

First, some joint exercises should engage one unified CINC staff against another. Symmetric engagements would have, for example, Atlantic Command Staff versus Pacific Command Staff. Asymmetric engagements would have Atlantic Command Staff versus Southern Command Staff. The natural

competitiveness of these professional staffs engaged in free play wargaming should provide staff conditions much closer to combat.

Second, impose the real world. The advent of computer simulation in real world exercises is revolutionary. The ability to insert simulated forces and environmental effects into real-time displays is a training force multiplier. This will, and has, allowed the use of a relatively small number of actual forces to engage in a regional war scenario. The difference from wargaming is the inclusion of real forces. The interaction of real commanders leading real troops with operational level staffs adds dimensions of sophistication and interplay unavailable in computers. Miscommunications, misunderstandings, innovation, and genius coupled with two opposing CINC or Joint Task Force staffs bring the exercise closer to actual operations. In addition, the operational level staff will not be insulated from real world tactical execution and results.

Unfortunately, the Navy has not progressed as far in the area of operational art if Navy Doctrine is the gauge. Naval Doctrine Publication (NDP) 1, Naval Warfare, and NDP 6, Naval Command and Control, do not address operational art as defined in joint publications. Allusions to operational art are few. While operational level of war is referred to, no significant development of the concept or its applicability is provided.

Perhaps the long awaited NDP 3, Naval Operations, will address operational art.³⁶

It may be suggested the operational level Navy Mission Essential Task List (NMETL) currently under development will address the issue of operational art through the standards associated with each essential task.³⁷ This does not address the Carrier Battle Group (CVBG) Commander or the fleet in general. While the CVBG normally operates at the tactical level of warfare it occupies a unique position in the U.S. Armed Forces due to the forward presence doctrine. Since the CVBG is expected to be the first significant armed force at a crisis it may be expected to evolve into a Joint Task Force as other units arrive in theater. As the nucleus of a potential Joint Task Force, the CVBG Commander and staff must be well versed in operational art as they will be engaged in that capacity at the operational level. Presently operational art is not exercised during pre-deployment work-ups and subsequent Fleet Exercises (FleetEx). These are almost exclusively for tactical level training and evaluation.³⁸

Action to correct these Navy deficiencies, especially in light of the operational failure at Midway, is warranted. The joint operational training program provides a working methodology with high potential to satisfy the Navy's operational level of war needs. In addition Navy doctrine should immediately be revised to reflect joint doctrine in

order to provide a common vocabulary between the Navy and the other services and CINCs.

Conclusions

The operational failure at Midway resulted from the failure to abide by the operational art factors of synergy, simultaneity and depth, anticipation, and leverage. These were compounded by failure to provide adequate C3I system operational support. These failures were a consequence of the submarine force, and the Navy, not adequately addressing and training on operational art during the interwar years.

Today, Navy doctrine and training still have not adequately addressed operational art though it is an essential part of joint warfare. The present use of exercises designed only to test and build tactical proficiency of air, land, or sea forces risk the same type of operational failure in future wars.

The effectiveness of operational level training must be a function of the quality of the decisions made. Suggestions on how to enact operational level decision quality evaluation and on how to further develop operational art include:

- (1) engage CINC staff versus CINC staff in wargaming,
- (2) continue to apply and further develop computer simulations which may be applied to actual exercises,
- (3) revise Naval doctrine to agree with joint doctrine,

(4) ensure CVBG staff are trained and evaluated on operational art.

NOTES

1. U.S. Department of Defense, DOD Dictionary of Military and Associated Terms, Joint Publication 1-02 (Washington: Joint Staff 1994), 274.
2. John D. Alden, The Fleet Submarine in the U.S. Navy (Annapolis, MD: Naval Institute Press 1979), 5; J. E. Talbott, "Weapons Development, War Planning and Policy: The US Navy and the Submarine, 1917-1941," Naval War College Review, May-June 1984, 57; Clay Blair, Jr., Silent Victory: The U.S. Submarine War Against Japan (Philadelphia: Lippincott, 1975), 48. War Plan Orange required an average speed of 17 knots which set a maximum sustained surface speed of at least 21 knots for a fleet submarine.
3. J. E. Talbott, "Weapons Development, War Planning and Policy: The US Navy and the Submarine, 1917-1941," Naval War College Review, May-June 1984, 58.
4. W. J. Holmes, Undersea Victory: The Influence of Submarine Operations on the War in the Pacific (Garden City, NY: Doubleday, 1966), 46; Clay Blair, Jr., Silent Victory: The U.S. Submarine War Against Japan (Philadelphia: Lippincott, 1975), 47.
5. Janet M. Manson, Diplomatic Ramifications of Unrestricted Submarine Warfare, 1939-1941 (New York: Greenwood Press, 1990), 40; J. E. Talbott, "Weapons Development, War Planning and Policy: The US Navy and the Submarine, 1917-1941," Naval War College Review, May-June 1984, 61; Robert E. Kuenne, The Attack Submarine: A Study in Strategy (New Haven, CT: Yale University Press, 1965), 155-156; Clay Blair, Jr., Silent Victory: The U.S. Submarine War Against Japan (Philadelphia: Lippincott, 1975), 46-52, 58-69; W. J. Holmes, Undersea Victory: The Influence of Submarine Operations on the War in the Pacific (Garden City, NY: Doubleday, 1966), 46-47.
6. This proved ironic since unrestricted guerre de course turned out to be the primary effective means of submarine warfare against the Japanese in World War II. Submarine training, however, prior to 7 December 1941 scrupulously avoided guerre de course. As to how unrestricted guerre de course became available to the submarine force on 7 December 1941 with Admiral Stark's order to "Execute against Japan unrestricted air and submarine warfare.", see Janet M.

Manson's Diplomatic Ramifications of Unrestricted Submarine Warfare, 1939-1941 (New York: Greenwood Press, 1990); J. E. Talbott's "Weapons Development, War Planning and Policy: The US Navy and the Submarine, 1917-1941," Naval War College Review, May-June 1984; and Gary E. Weir's "The Search for an American Submarine Strategy and Design, 1916-1936," Naval War College Review, Winter 1991, for differing viewpoints on when unrestricted submarine warfare was first considered as U.S. policy. In any case U.S. submarines did not train on unrestricted submarine warfare prior to 7 December 1941.

7. Janet M. Manson, Diplomatic Ramifications of Unrestricted Submarine Warfare, 1939-1941 (New York: Greenwood Press, 1990), 40-41, 44, 47-48; J. E. Talbott, "Weapons Development, War Planning and Policy: The US Navy and the Submarine, 1917-1941," Naval War College Review, May-June 1984, 59.

8. The fact U.S. submarines did not train on guerre de course prior to World War II had no significant effect on submarine tactics after 7 December 1941. The tactics and training required to penetrate a destroyer screen and attack the heavy warships within the formation were fundamentally the same as attacking slower merchants in convoy. See J. E. Talbott, "Weapons Development, War Planning and Policy: The US Navy and the Submarine, 1917-1941," Naval War College Review, May-June 1984, 68.

9. Gary E. Weir, "The Search for an American Submarine Strategy and Design, 1916-1936," Naval War College Review, Winter 1991, 34, 40-41.

10. *ibid.*, 40.

11. John D. Alden, The Fleet Submarine in the U.S. Navy (Annapolis, MD: Naval Institute Press 1979), 42; Gary E. Weir, "The Search for an American Submarine Strategy and Design, 1916-1936," Naval War College Review, Winter 1991, 41.

12. J. E. Talbott, "Weapons Development, War Planning and Policy: The US Navy and the Submarine, 1917-1941," Naval War College Review, May-June 1984, 61. The combat efficacy of the submarine in independent operations against an enemy fleet was demonstrated in the mid-1930s. An exercise culminated in the **defeat of a U.S. battle fleet off Midway after it had been attrited by enemy submarines.** See George W. Baer's "U.S. Naval Strategy 1890-1945," Naval War College Review, Winter

1991, 18.

13. Samuel Eliot Morrison, History of United States Naval Operations in World War II, Vol. IV (Boston: Little, Brown, 1950), 189-190.

14. John D. Alden, The Fleet Submarine in the U.S. Navy (Annapolis, MD: Naval Institute Press 1979), 74.

15. George W. Baer, "U.S. Naval Strategy 1890-1945," Naval War College Review, Winter 1991, 18; Samuel Eliot Morrison, History of United States Naval Operations in World War II, Vol. IV (Boston: Little, Brown, 1950), 190.

16. J. E. Talbott, "Weapons Development, War Planning and Policy: The US Navy and the Submarine, 1917-1941," Naval War College Review, May-June 1984, 63; Clay Blair, Jr., Silent Victory: The U.S. Submarine War Against Japan (Philadelphia: Lippincott, 1975), 76.

17. Clay Blair, Jr., Silent Victory: The U.S. Submarine War Against Japan (Philadelphia: Lippincott, 1975), 58, 84; Keith Wheeler, World War II: War Under the Pacific (Alexandria, VA: Time-Life Books, 1980), 27. The first test of an extended combat deployment was conducted in October 1941 with a 45 day patrol by two older class submarines.

18. Samuel Eliot Morrison, History of United States Naval Operations in World War II, Vol. IV (Boston: Little, Brown, 1950), 92; Francis E. McMurtrie, ed., Jane's Fighting Ships 1941 (New York: Macmillan, 1942), 480-482; John D. Alden, The Fleet Submarine in the U.S. Navy (Annapolis, MD: Naval Institute Press 1979), 74, 101.

19. Mitsuo Fuchida and Masatake Okumiya, Midway, the Battle that Doomed Japan (Annapolis, MD: Naval Institute Press, 1955), 80-82.

20. Richard W. Bates, The Battle of Midway Including the Aleutian Phase, June 3 to June 14, 1942, Strategical and Tactical Analysis (Newport, RI: Naval War College Press, 1948), 68, 80, 144-147, 165-167, 180-181, 187-188; U.S. Navy Dept. Commander-in-Chief, U.S. Fleet, Battle Experience from Pearl Harbor to Midway, December 1941 to June 1942 (Washington: Navy Department, 1943), 8-15 to 8-16; George W. Prange, Donald M. Goldstein, and Katherine V. Dillon, Miracle at Midway (New York: McGraw-Hill, 1982), 437-445; Clay Blair, Jr., Silent Victory: The U.S. Submarine War Against Japan (Philadelphia: Lippincott, 1975), 236-249; Keith Wheeler,

World War II: War Under the Pacific (Alexandria, VA: Time-Life Books, 1980), 42-43.

21. Clay Blair, Jr., Silent Victory: The U.S. Submarine War Against Japan (Philadelphia: Lippincott, 1975), 239.

22. Samuel Eliot Morrison, History of United States Naval Operations in World War II, Vol. IV (Boston: Little, Brown, 1950), 84-85, 90-92; William Ward Smith, Midway: Turning Point of the Pacific (New York: Crowell, 1966), 134, 135, 161, 163; George W. Prange, Donald M. Goldstein, and Katherine V. Dillon, Miracle at Midway (New York: McGraw-Hill, 1982), 323; W. J. Holmes, Undersea Victory: The Influence of Submarine Operations on the War in the Pacific (Garden City, NY: Doubleday, 1966), 45-46, 135. While RADM English maintained OPCON over submarines at Midway Holmes contends English "had little to say about the strategy of submarine employment."--Holmes, 135.

23. Richard W. Bates, The Battle of Midway Including the Aleutian Phase, June 3 to June 14, 1942, Strategical and Tactical Analysis (Newport, RI: Naval War College Press, 1948), 69.

24. U.S. Dept. of Defense, Doctrine for Joint Operations, Joint Publication 3-0 (Washington: Joint Staff, 1995), xi-xii, III-9 to III-24;

25. Except where otherwise noted, facts of the battle in support of my analysis were taken from: Richard W. Bates, The Battle of Midway Including the Aleutian Phase, June 3 to June 14, 1942, Strategical and Tactical Analysis (Newport, RI: Naval War College Press, 1948), 66-72, 80, 144-147, 165-167, 180-181, 187-188; U.S. Navy Dept. Commander-in-Chief, U.S. Fleet, Battle Experience from Pearl Harbor to Midway, December 1941 to June 1942 (Washington: Navy Department, 1943), 8-4 to 8-16.

26. Backing up the two arcs were two submarines at the 50 mile arc northwest of Midway and along the expected Japanese axis of approach. While placement of the arcs may have been adequate the composition of the arcs was not. In a peculiar move the technically obsolescent submarines USS Dolphin (commissioned 1932, and underpowered) and USS Nautilus (commissioned 1930 and underpowered) were placed in the 200 and 150 mile arcs, respectively, while a modern Gato class fleet submarine, USS Flying Fish, remained at the 50 mile arc. In the case of Nautilus this proved fortunate as it was the

only submarine to consistently attack the Japanese on 4 June. Nautilus in the space of eight hours fired six torpedoes (one hit but was a dud), was fired on by the surface escort fleet, took five depth chargings, and was bombed once and still kept attacking--a testimony to her commanding officer, Lieutenant Commander W. A. Brockman, Jr., and her crew. While not putting anything on the bottom, Nautilus was effective in sowing mass confusion among the Japanese just prior to and during the U.S. air attacks. In an irony of the battle, which argues the essential factor of synergy--planned or not, McCluskey and his air squadron followed the destroyer Arashi, after its depth charging of the Nautilus, to the Japanese carriers. See Clay Blair, Jr., Silent Victory: The U.S. Submarine War Against Japan (Philadelphia: Lippincott, 1975), 57-58, 239-245; Chronology in George W. Prange, Donald M. Goldstein, and Katherine V. Dillon, Miracle at Midway (New York: McGraw-Hill, 1982), 442; and Richard W. Bates, The Battle of Midway Including the Aleutian Phase, June 3 to June 14, 1942, Strategical and Tactical Analysis (Newport, RI: Naval War College Press, 1948), 144-145.

27. W. J. Holmes, Undersea Victory: The Influence of Submarine Operations on the War in the Pacific (Garden City, NY: Doubleday, 1966), 147.

28. Nautilus did monitor search aircraft clear voice frequencies which allowed her to close on the Japanese beginning at 0544. All other submarines followed the 0730 directive though they had been surfaced all the preceding night and at periscope depth during the day and thus able to monitor communications. See Richard W. Bates, The Battle of Midway Including the Aleutian Phase, June 3 to June 14, 1942, Strategical and Tactical Analysis (Newport, RI: Naval War College Press, 1948), 144-145.

29. Submarines were ordered to remain on the surface at night then submerge and remain at periscope depth during the day. Submarine commanding officers were further directed to be ready to surface during daylight hours and close the enemy in case of a sighting report. See Richard W. Bates, The Battle of Midway Including the Aleutian Phase, June 3 to June 14, 1942, Strategical and Tactical Analysis (Newport, RI: Naval War College Press, 1948), 67.

30. Which is what happened, but, more importantly, it was what was most likely to happen given Japanese naval history. The Invasion Force Main Body under Vice Admiral Kondo steamed in from the southwest while Admiral Yamamoto's Main Body steamed in from the northwest. These two fleets

then escorted Nagumo's sizeable remaining forces out of the area. See Mitsuo Fuchida and Masatake Okumiya, Midway, the Battle that Doomed Japan (Annapolis, MD: Naval Institute Press, 1955), 80-82, 211, 222.

31. Whether this was a retirement to regroup or a general retreat to Japanese waters was immaterial. Use of half the arc submarines to attack the Japanese while maintaining half near Midway to guard against invasion would have been preferable to the retirement of all submarines to within five miles of Midway. This had the effect of penning up the submarines even if the invasion force had continued to Midway.

32. Samuel Eliot Morrison, History of United States Naval Operations in World War II, Vol. IV (Boston: Little, Brown, 1950), 148.

33. Joseph C. Barto, III, "The Joint Training System: A Pillar of Joint Readiness," Joint Warfighting Center A Common Perspective, March 1996, 28.

34. U.S. Dept. of Defense, Universal Joint Task List. CJCSM 3500.04 Version 2.1., (Washington: Joint Staff, 1995), 1-1 to 1-2, 2-1 to 2-2.

35. U.S. Dept. of Defense, Joint Warfighting Center Product and Services Directory, (Fort Monroe, VA: Spring 1995), 4, 8-11.

36. The recently approved NDP 5, Naval Planning, was unavailable for review.

37. M. Maliniak, "Navy Mission Essential Task List (NMETL) Conference," Joint Warfighting Center A Common Perspective, March 1996, 21.

38. J. D. Oliver, III, "To Train to Fight." U.S. Naval Institute Proceedings, September 1995, 40-42.

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