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NAVAL WAR COLLEGE
Newport, RI

SUBMARINE OPERATIONS
DURING THE
FALKLANDS WAR

by

Steven R. Harper
Lieutenant Commander, United States Navy

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

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Abstract of
SUBMARINE OPERATIONS DURING THE FALKLANDS WAR

This paper contains an analysis of submarine operations during the Falklands War. This was done to provide some insight on the importance of submarines in this conflict and to show the usefulness of submarines in any maritime conflict. The submarine operations by both belligerents are looked at and compared over the duration of the conflict. This is an unclassified study that was researched using published books, magazine articles, unpublished papers, unclassified government documents and interviews with officers involved in the conflict. Reports done at a classified level were not used in the preparation of this paper. The submarine operations and methods of employment examined show the strength of submarines when properly used and the weakness when training is lacking or the submarine is used in the wrong manner. Also highlighted is the difficulty of antisubmarine efforts in a high ambient noise, shallow water environment. Submarines can be a force multiplier to any navy when used properly and can frustrate an opponent by their presence or even their perceived presence. However, to get the full use of submarines they must be integrated fully into the military forces. With just a few boats in a navy, the submarines are wasted if they are operated independently. They must be fed intelligence or be intelligence platforms themselves to fully realize their potential. This point was not adhered to fully and thus submarines did not make the impact expected during the Falklands War.

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SUBMARINE OPERATIONS DURING THE FALKLANDS WAR

CHAPTER I

INTRODUCTION

Many books have been written on the Falklands War. Most have been written covering all aspects of the war: the naval war, the ground war and the air war. While submarines have been discussed in the history text of these documents, none have concisely covered the submarine operations in the war. By synthesis this paper will try to expand on the submarines' role in the Falklands War and bring out some salient points. These points will lead the reader to understand the usefulness of submarines in any maritime conflict; even if a country only has one submarine to offer. Submarines act as a force multiplier by enhancing a country's navy in much the same manner that special forces enhance a conventional army. The British used this force multiplier to take control of the seas during the war. Viewed from the other side, Argentina's small number of submarines forced the British to employ a substantial antisubmarine effort: 12 ships, 6 submarines and over 25 helicopters. Finally some recommendations will be made covering the employment of submarines on both sides that may have changed the outcome of the war.

CHAPTER II

BACKGROUND

Initial Incident. In March of 1982 a group of Argentine scrap metal workers landed on the island of South Georgia to dismantle obsolete whaling facilities. The venture was approved by both the British Embassy and the Argentina Foreign Ministry. The party set sail on board the Argentine ship *Buen Suceso* and landed at Stromness Bay. The port of entry should have been Grytviken. A team from the British Antarctic Survey explained this to the captain of the *Buen Suceso*. This team had witnessed the landing and the spontaneous ceremony of the workers raising an Argentine national flag. Due to the difficulty of landing the ship and since part of the cargo had been unloaded, the *Buen Suceso's* captain elected to stay until he could contact his Buenos Aires office for guidance. Complications with the communication did not allow contact and the captain continued with his original orders. He informed the survey party that he would remain at Stromness Bay.¹

News of this incident was transmitted to London, but the tone of the report implied that the Argentines had invaded South Georgia with civilian and military personnel. This was picked up by the press and fueled public outcry that something had to be done to stop this outrage. The British Foreign Office sent a message to the Argentine Foreign Ministry that directed all personnel landed by the *Buen Suceso* to leave South Georgia. These reactions and overreaction continued on both the British and Argentine side. The Argentine military junta, knowing that the British were sending a task force, felt that now was the proper time to act. They approved the conduct of "Operation Azul": the plan to invade and take control of the Falkland Islands.

Nature of the War.

The first, the supreme, the most far-reaching act of judgment that the statesman and commander have to make is to establish . . . the kind of war on which they are embarking, neither mistaking it for, nor trying to turn it into something that is alien to its nature. This is the first of all strategic questions and the most comprehensive.²

The kind of war that the Argentines were starting was not the same kind that the British would fight. The Argentines were embarking on a very limited conflict. It was to have little, or preferably no,

bloodshed, last only a brief time and be resolved by diplomatic means. When asked about writing a plan for sustaining the troops along with the occupying plan, Argentine Admiral Jorge Isaac Anaya, commander in chief of the Argentina Navy, replied emphatically "plan for occupying only."³ They were to only occupy for a short time; the invasion was to send a diplomatic signal, not a military one. The occupation was designed to force Britain back into negotiations, which they had left in February 1982, for shifting sovereignty over the Malvinas Islands (Falklands) to Argentina.⁴ Since the invasion had been bloodless, the force on the island was a "token" force (500 men), and there were no plans to reinforce or sustain this force for a long period, the Argentines felt that this was just a gentle push to get the British back to the negotiating table.

The reaction of the British was not as the Argentines expected. The British viewed the invasion as a direct slap in the face. The British Ambassador to the United Nations called a meeting of the Security Council to discuss a resolution to condemn Argentina's actions. United Nations Resolution 502 was the result. It called for the immediate cessation of hostilities between the United Kingdom and Argentina, immediate withdrawal of Argentine forces from the Falkland Islands, and for the two governments to seek a diplomatic solution.⁵ Britain also deployed a naval task force to the area in case the resolution alone did not solve the problem. The Argentine forces continued to occupy the Falklands and went on to invade and occupy South Georgia; this action taking place the same day Resolution 502 was being signed. Since the resolution alone was not solving the conflict, the British took further unilateral measures.

The first of these measures was to declare a 200 mile maritime exclusion zone around the Falkland Islands against Argentine naval ships. This "war zone" was to prevent any reinforcement and resupply of the Argentine troops presently occupying the islands. The British were still continuing diplomatic efforts but they were gradually shifting towards a military solution. The British nature of the war was quickly moving away from the limited conflict that the Argentines initially envisioned. The British were going to take back the islands before any discussion of a shift of sovereignty.

CHAPTER III

BRITISH OPERATIONAL PLAN FOR SUBMARINES

British Submarines in the Falklands War. The first British ships to deploy to the South Atlantic were nuclear powered submarines. The *H.M.S. Spartan* and *H.M.S. Splendid* both sailed on 1 April 1982. These are both Swiftsure class submarines, have five torpedo tubes, and are powered by a nuclear reactor. The *H.M.S. Conqueror* followed on 4 April. She is an older Valiant class submarine with six torpedo tubes and is also powered by a nuclear reactor. Between 10 and 12 May three other submarines sailed to the South Atlantic. These were the *H.M.S. Valiant* and *H.M.S. Courageous*, both Valiant class submarines, and the *H.M.S. Onyx*, an Oberron class diesel powered submarine with six bow and two stern torpedo tubes.

Operational Plans. The British naval strategy for the conflict consisted of four phases:

First -- Enforce the 200-mile maritime exclusion zone with submarines.

Second -- When surface forces arrive, establish air and sea superiority.

Third -- Land troops to retake the islands.

Fourth -- Support the land war and protect sea lines of communication.¹

Submarines were involved in all four phases. In the first phase they were the enforcer of the "war zone." During the second phase they proved to be the ships that established control of the seas. During the third and fourth phases, submarines acted as early warning for planes approaching the task group and islands. Table I contains the dates and major submarine events during the war.

Submarine Operations in Phase One. Upon their arrival, the three submarines were placed into separate patrol areas and reported on Argentine activities. The *Spartan* watched the approaches to Stanley, the *Splendid* patrolled between the coast of Argentina and the Falkland Islands, and the *Conqueror* was sent to South Georgia.

During this phase the *Spartan* observed the Argentine naval landing ship *Cabo San Antonio* off Stanley conducting what appeared to be mine laying operations. Due to the rules of engagement, the *Spartan* could not attack this obvious threat. The *Conqueror* conducted surveillance operations and

landed a reconnaissance party of Special Boat Service personnel on the northern part of South Georgia.

Submarine Operations in Phase Two. To best support his task group, Admiral Sandy Woodward, the task group commander, proposed a change in the operating methods for the British

Table I
Major Events and Submarine Operations during the Falklands War

28 March	Argentine submarine <i>Santa Fe</i> joins Task Force 40, the Falklands landing force
31 March	<i>Santa Fe</i> ordered to conduct reconnaissance of landing beaches near Stanley
1 April	British submarines <i>Spartan</i> and <i>Splendid</i> sail to South Atlantic
2 April	<i>Santa Fe</i> lands 10 frogmen at Yorke Bay to ensure beach is clear of defenses Argentina invades the Falkland Islands
3 April	Argentina invades South Georgia
4 April	British submarine <i>Conqueror</i> sails to South Atlantic with Special Boat Service (SBS) men aboard
5 April	British surface task force sails
8 April	Argentine submarine <i>San Luis</i> departs for patrol
11 April	<i>Spartan</i> , <i>Splendid</i> and <i>Conqueror</i> arrive in the South Atlantic <i>Spartan</i> watches the approaches to Stanley <i>Splendid</i> patrols between Argentine coast and the Falkland Islands <i>Conqueror</i> goes to South Georgia
12 April	200 mile "war zone" declared by British
12-30 April	<i>Spartan</i> observed Argentine LST <i>Cabo San Antonio</i> off Stanley on four days in a row, apparently laying mines
19 April	<i>Conqueror</i> puts an SBS reconnaissance party ashore on north coast of South Georgia
23 April	Report of an Argentine submarine approaching South Georgia, <i>Conqueror</i> searches for submarine but does not find it
25 April	<i>Santa Fe</i> is attacked and beached near Grytviken, South Georgia British retake South Georgia
29 April	<i>Spartan</i> spots Type 42 destroyers and other ships about 300 miles north of Falklands
1 May	British task force arrives at "war zone" <i>San Luis</i> attacks British warship, the British counterattack Submarine contact gained about 20 miles north of Stanley by British Sea King Helos, contact is depth charged, an oil slick was seen <i>Conqueror</i> finds and trails Argentine Cruiser <i>General Belgrano</i>
2 May	<i>General Belgrano</i> sunk by <i>Conqueror</i>
7 May	British declare that all Argentine ships greater than 12 miles from Argentine coast will be attacked
8 May	<i>San Luis</i> attacks British submarine
10 May	<i>San Luis</i> attacks 2 British warships
10-12 May	British submarines <i>Courageous</i> , <i>Valiant</i> , and <i>Onyx</i> sail for South Atlantic
16 May	<i>Valiant</i> arrives in the South Atlantic
21 May	Major landing of British troops on Falkland Islands
8 June	<i>Valiant</i> spots Argentine air planes going from Rio Grande towards Falklands
13 June	Argentine troops on Falkland Islands formally surrender to British

Source: Middlebrook, Martin, Operation Corporate The Falklands War, 1982 (London: Viking, 1985), v.p.

submarines. He did not want the submarines to be bounded by operational areas and instead wanted to allow them to search freely. They were to search for and attach themselves to Argentine surface ship groups. The submarines then would stay with the group, or at least with the high value unit in a group, ready to attack when authorized. To avoid blue on blue encounters, the submarines would not be allowed to engage submerged contacts. He felt that the Argentine submarine threat was only near Port Stanley and the limitation to the submarines to not fire at other submarines would not affect early operations.² There would also have to be some depth separation scheme set up for the British submarines, but this would not be difficult, the important thing is that they would be allowed free reign to search for the Argentine surface heavies and be ready to sink them. Admiral Woodward also believed that the submarines should be under his operational control "in case it became necessary to deal with a quickly changing set of circumstances that would require very early action."³

The Flag Officer, Submarines, located at Northwood with the rest of the fleet staff, did not share this view and thus did not authorize this new operational method. Furthermore, the submarines would remain under Northwood's control. The plan that Northwood directed was to divide the area up into four quadrants, with submarines staying in their assigned quadrant(s). *Spartan* would patrol the northwest, *Splendid* would patrol the northeast, and *Conqueror* would patrol the southwest and southeast quadrants. This separation of submarines by area is consistent with the way the operations were practiced in the North Atlantic; the submarines would fight the way they had trained.

Submarine Operations in Phases Three and Four. During these phases the nuclear powered submarines were used as lookouts; each posted along the coast of Argentina near military airfields. They would tell the task group of Argentine sorties from the mainland that were flying towards the Falkland Islands. The Argentine fleet had retired, negating the anti-surface ship mission, and the submarines could not attack airplanes or troops on shore; intelligence gathering was the only logical mission left. Using a submarine for this also has advantages over a surface ship. They are covert and thus were not subject to attack. Additionally, the outgoing sorties would not know that they had been spotted or that a warning had gone to the task force on their impending attack.

CHAPTER IV

ARGENTINE OPERATIONAL PLAN FOR SUBMARINES

Argentine Submarine Force. The Argentine Submarine Force consisted of four diesel powered submarines. They had two Guppy Class submarines that were purchased from the United States: the *A.R.A. Santa Fe*, ex-USS *Catfish*(SS-339), and the *A.R.A. Santiago del Estero*, ex-USS *Chivo*(SS-341). These both had 10 torpedo tubes; six forward and four aft. The other two boats in their force were both Type 209 submarines; the *A.R.A. Salta* and the *A.R.A. San Luis*. These were built in Germany, have eight forward torpedo tubes, and are considered the German's most successful export design.

At the start of the conflict half of the Argentine submarines were not operational. The *Salta* was in a major yard availability. The required work was completed rapidly and she put to sea for trials. During her sea trials, *Salta* made excessive noise. This made her too easy to find and she was returned to the yard for repairs. These repairs were not completed until after the conflict ended and thus she did not enter the war. The *Santiago del Estero* was not fit for submerged operations. She had been decommissioned in September 1981 and was in use as a static training ship at the submarine base at Mar del Plata. At the beginning of the conflict she was moved to Bahia Blanca and camouflaged. The Argentines believed that Britain was receiving overhead photography and was trying to convince the British that she was underway, thus the British would overestimate the size of the submarine threat.¹

The only two operational submarines during the war were the *Santa Fe* and the *San Luis*, but even these two had problems. The *Santa Fe* was old and her capabilities were reduced. The *San Luis* was fully operational but had a new crew that had little experience fighting the ship.

Operational Plans. The plans for the Argentine Navy resulted from a series of discussions and compromises. An idea that was rejected was to interdict the British sea lines of communication with their only aircraft carrier, the *A.R.A. Veinticinco de Mayo*. Since the Argentines were planning on a diplomatic solution, attacking and sinking British ships could not be allowed at the early stages of the war. In addition, the loss of Argentina's only aircraft carrier would have been devastating to the

country, not only in the conflict but in her post war relations with neighboring countries. Therefore this option was discarded.

A second discarded option was to place Argentine surface ships in key ports to act as mobile shore guns. This would allow more firepower available for defense of the islands that they now held. The downfall here is that the ships would be stationary and easier to attack, and thus this plan was also rejected.

The strategy that was accepted for the Argentine Navy was one of a "fleet in being" concept. Again the need for a strong post conflict navy drove the military junta to this plan. The Mahanian decisive battle would be avoided. Instead a war of attrition would take place. The fleet would not conduct a direct attack; they would only attack when the odds were in their favor. Otherwise they would remain outside any declared British exclusion zones and wait for a target of opportunity. Air power was used to provide the offensive punch from the Argentines and their fleet would be held in reserve. There was also some concern that Britain would be able to track the Argentine fleet by satellite and to avoid being attacked they must keep their ships well out of harms way.² This option also allows more time for a diplomatic settlement, which was the Argentine preferred method to end the conflict.

Submarine Operations to Support the Approved Strategy. The Argentine submarine force consisted of only the *Santa Fe* and the *San Luis*; the other two boats did not participate in the war. The *Santa Fe* conducted commando landing operations and ran supplies. The *San Luis* conducted a patrol to the north of the Falkland Islands and was to attack British ships that entered her area. Had the *Santa Fe* not been captured early in the war, she would have patrolled the seas between Ascension and the Georgias attempting to interdict the British lines of communications.³

CHAPTER V

ACTUAL SUBMARINE OPERATIONS/SIGNIFICANT INCIDENTS

Rules of Engagement. The rules of engagement changed during the conflict in the classic escalation manner. The rules of engagement for both sides are summarized in Table II. The rules of engagement were directed from the top of the governments to the operators on both the Argentine and British sides. Some changes were requested by operational commanders on the scene and approved via the chain of command.

Table II

Rules of Engagement

<u>Argentine</u>	
2 April	Shed no British blood and damage no British property while invading Fire only when fired upon
30 April	Weapons authorized to be used against the British
<u>British</u>	
12 April	Attack in Maritime Exclusion Zone (200-nautical mile)
23 April	Guns free on any force believed to be a threat
26 April	25 mile defense area established around all units of task force
29 April	Attack any vessels shadowing the task force
30 April	Total Exclusion Zone declared (adds airplanes to authorized targets)
2 May	Submarines authorized to attack any Argentine warships
7 May	Total Exclusion Zone (everywhere except within 12 miles of Argentina)
12 May	Attack merchant and fishing vessels if engaged in resupplying the islands

Sources: Falkland Islands Campaign Understanding the Issues (Washington: National Defense University, 1986), 1v, pp. 80 and 147-149.

Martin Middlebrook, Operation Corporate: The Falklands War, 1982 (London: Viking, 1985), p. 147.

Max Hasting and Simon Jenkins, The Battle for the Falklands (New York: W.W.Norton & Company, 1983), p. 147.

A.R.A. Santa Fe Operations.¹ The *Santa Fe* was the only Argentine submarine involved in the invasion of the Falkland Islands. Her first mission was to land commandos at Cape Pembroke Lighthouse on East Falkland. She was not to attack any shipping and to remain undetected. She departed Mar del Plata on 26 March to conduct these operations. While en route, the British discovered the plan to invade and had reinforced the lighthouse. Since it was now defended too

heavily for an assault with such a small force, the plans were changed and *Santa Fe* received new orders. She was now to land the commandos on the beach north of the lighthouse. This was done on 2 April at 0200. *Santa Fe* patrolled the area a few days, then returned to Mar del Plata.

While at Mar del Plata, *Santa Fe* prepared for a 60 day patrol. She departed the night of 8 April with 20 men and supplies to deliver to South Georgia. Since her patrol area was in the vicinity of South Georgia and the maritime exclusion zone had been established, the men and supplies were sent by submarine. During her trip she detected enemy active sonar, but *Santa Fe* was not discovered. On 24 April at 2200 she surfaced at Cumberland Bay, South Georgia and met with launches from Grytviken. These launches took the men and supplies to the island. After completing the personnel and material transfer, she headed back out to sea.

The next day at 0900, while heading towards water deep enough for submerging, the *Santa Fe* was spotted by a British helicopter and attacked with rockets. The submarine's commander decided not to dive the ship for fear of depth charges and torpedoes; he felt that he was safer on the surface. The *Santa Fe* was hit several times with missiles and depth charges exploded nearby. This did enough damage to force the submarine to beach herself in King Edward Cove. The crew abandoned ship and was later captured when South Georgia was taken by the British. Thus Argentina was left with only one operational submarine, the *San Luis*.

A.R.A. San Luis Operations.² The *San Luis* departed for patrol during the second week of April and conducted one continuous patrol during the war. She was to patrol north of the Falkland Islands and attack British ships as her rules of engagement permitted. She claims a total of three attacks, two of which used the German-made SST-4 anti-surface ship torpedo and the other used an American-made Mark 37 antisubmarine torpedo. The first approach, on 1 May, was on medium sized warships with helicopters as identified by sonar only. These warships were the *H.M.S. Brilliant* and the *H.M.S. Yarmouth*. The attack was unsuccessful and the *San Luis* was counterattacked for 20 hours with depth charges and at least one torpedo.³

The second approach, on 8 May, was against a submarine. Twelve minutes after firing the Mark 37 torpedo an explosion was heard from the bearing of the target. The British report no losses of submarines and thus the torpedo may have impacted against the bottom.

The final approach, on 10 May, also done without the periscope, was on a pair of destroyers: the *H.M.S. Arrow* and *H.M.S. Alacrity*. One torpedo was fired at the ships. This attack was unsuccessful, but a small explosion was heard on the correct bearing 6 minutes after firing the torpedo. Later, when the *Arrow* was retrieving her towed countermeasure "it was damaged -- conclusive proof that British electronic countermeasures had outwitted the SST-4's homing device."⁴ An attack on the second ship was not conducted since the distance had opened too quickly and the ship was now out of range.

Problems with the torpedoes and shipboard torpedo systems contributed to the three misses. The fire control computer on *San Luis* was out of service and the fire control solution had to be calculated manually. Additionally, the wires broke on all the weapons shortly after firing which took away the ability to steer the weapon after the time of fire. These problems and the opinion that the torpedoes were fired with the submarine too deep, had direct influence on the outcome of each shot.⁵ There is also evidence that the SST-4 torpedoes were not properly prepared in the torpedo room before loading the weapons in the torpedo tubes. This error did not allow the torpedoes to arm themselves after time of fire. If this is the case then all shots with these weapons would only be able to damage a target with the kinetic force of the torpedo ramming the target. There would be no explosion, just a strike like that of a battering ram. The reports of a torpedo bouncing off the hull of a British ship and the damage, but not total destruction, to *Arrow's* countermeasure sled are consistent with this thesis. In both cases, if the torpedo had exploded the damage would have been much more severe; the sled would have been totally destroyed and the ships sunk. The small explosions heard by the Argentines may have just been the noise of the collision between the torpedoes and their targets.

*H.M.S. Spartan and H.M.S. Splendid Operations.*⁶ The *Spartan* and the *Splendid* sailed for the South Atlantic on 1 April and arrived ten days later. To enforce the Maritime Exclusion Zone the

Spartan patrolled near Port Stanley to watch for reinforcements. In the period from 12 April to 30 April on four consecutive days, she observed the Argentine Landing Ship, Tank A.R.A. *Cabo San Antonio* conducting mine laying operations. The *Splendid* was assigned to patrol between the coast of Argentina and the Falkland Islands.

When the naval task force arrived, the *Spartan* and *Splendid* moved to new patrol areas; to the northeast and northwest of the Falkland Islands, respectively. On 29 April the *Spartan* gained visual contact with three Argentine Type 42 destroyers and reported this to Northwood.

H.M.S. *Conqueror* Operations.⁷ The *Conqueror* left for the South Atlantic on 4 April and arrived on 11 April, the same day as the *Splendid* and *Spartan*. Before sailing she embarked members of the British Special Boat Service (SBS). Her first patrol area was around South Georgia. On 19 April *Conqueror* put a SBS reconnaissance party ashore on the north side of South Georgia and continued patrolling in the area. On 23 April, a report was received that an Argentine submarine was headed for South Georgia (the *Santa Fe*) and *Conqueror* conducted an unsuccessful search for the submarine.

When the British naval task force arrived, the *Conqueror* took up a new patrol area south of the Falkland Islands. On 1 May she found the Argentine surface group based around the cruiser A.R.A. *General Belgrano*. She reported to Northwood and continued to trail the cruiser. *Belgrano* was outside the "war zone" but the rules of engagement were changed to allow the *Conqueror* to attack. The *Conqueror* fired three Mk 8 torpedoes (World War II vintage straight running torpedoes). Two hit the *Belgrano* and one hit an escorting ship with a glancing blow. This third torpedo did not explode and did not appear to damage the ship. The British submarine left the area while the two escorts conducted an unsuccessful counterattack. The cruiser sank approximately 45 minutes after being hit. After the sinking of the *Belgrano*, the Argentine fleet remained within 12 miles of the Argentine coast for the remainder of the war.

CHAPTER VI

ANALYSIS OF OPERATIONAL PLANS

Submarine Diplomacy. The threat of nuclear submarines deploying to the Falkland Islands forced the Argentine military junta into a decision to invade the islands. The deployment of two nuclear submarines to the South Atlantic was announced by the British media -- some sources say it was a controlled leak -- which indicated to the Argentines that there was going to be a military response from the British; the junta expected a diplomatic solution to the incident on South Georgia. Alarmed by "the British (submarines) are coming" a meeting of the junta was held to decide upon a course of action. The junta concluded that when the submarines had reached the Falklands, the Argentine military options would be reduced drastically. This convinced them to conduct *plan Azul*, the invasion plan for the Falkland Islands, before the submarines arrived. To wait until after the submarine's arrival would make the invasion very difficult if not impossible. They would have to delay the invasion until after the submarines left. However, the submarine deployment could last several years and termination would be hard to recognize. To avoid losing this opportunity, the junta felt they had to act and invade the islands before the submarines arrived; before 12 April. The British submarines had forced the military junta's hand.

The entry of submarines and their type of warfare into hostilities can cause conflict escalation. This not a new phenomenon; it occurred during both world wars. In more recent wars, submarines were consciously excluded from the conflict; in the Korean War and Vietnam War the United States did not use submarines in an offensive role (i.e., sinking ships), in part, to keep these wars limited. During the Falklands War, the British initially restrained the rules of engagement for submarines to "avoid opening the shooting war too soon and compromising the diplomatic efforts being pursued."¹ However the mere presence, or even perceived presence, of British submarines had a catalytic effect on the South Georgia crisis that led the two sides to war.

Deterrence Value of Submarines. The published fact that submarines were in the area of the Falklands was an attempt to keep the Argentine Navy from violating the maritime exclusion zone. The

declaration by the British was enough to keep Argentine merchant ships clear of the area. This resulted in the lack of sea lift to reinforce the troops on the Falkland Islands. Airborne supply was not hampered by the presence of submarines and was used, but the lift capability was less. Thus the submarines' presence did help enforce the maritime exclusion zone, but it was not a total blockade.

The Argentine Navy continued to enter the "war zone" until the British task force arrived. The entry of the British surface ships cleared out the maritime exclusion zone, but Argentine Navy ships still remained at sea around the fringe. It was not until the sinking of the *Belgrano* that the Argentine Navy retired to within 12 miles of their coast.

If the attack had been made by a surface ship or by air power, the demonstration would not have been as dramatic. A surface ship or an incoming airplane or missile can be detected and defeated. Conversely, a modern quiet submarine remains undetected and thus cannot be countered. The submarine's presence was unknown by *Belgrano* and her escorts until the *Conqueror's* torpedo exploded under the *Belgrano's* keel. This sent a very different message than sinking the ship by a surface ship, airplane, or missile. The Argentine Navy had no effective defense against a modern nuclear powered submarine. For them to venture beyond the 12 mile limit would be to go in harms way.

In spite of this the Argentine Navy still planned several surface ship raids after the sinking of the *Belgrano*. In each case cooler heads prevailed and they were called off before execution. The Argentine Navy could not afford to lose many ships and still be a viable force in the region; Argentina needed to maintain her "fleet in being."

Principles of War.

The *CONQUEROR* clearly took the "offensive" with the precise "objective" of sinking the *GENERAL BELGRANO* (and not her two escorts) before the Argentine cruiser left the threatening zone to the south of the Falklands. This called for precise timing – critical to the "tempo" [maneuver] of the operations. Utilizing the great "all-weather" [maneuver], "maneuver" capability of the nuclear submarine, *CONQUEROR* made a perfectly positioned "surprise" attack with an adequate "concentration of force" [mass] – three obsolete MK VIII torpedoes (an extremely austere "economy of force") – to accomplish her mission.²

This quotation illustrates the application of some of the modern principles of war -- plus a few new principles that are actually part of maneuver -- to the sinking of the *Belgrano* by *Conqueror*. This is only one instance where the principles of war pertained in the submarine operation during the Falklands War. The next few paragraphs will illustrate all the presently accepted principles of war -- Maneuver, Offense, Objective, Security, Economy of Force, Mass, Unity of Command, Surprise, and Simplicity -- as they apply to submarine operations with some examples from the Falklands War.

Maneuver. This is a strong trait of submarines. They can maneuver at will in the maritime battlefield. They can get to the decisive point undetected (tempo) and thus contribute significantly to the campaign. They are able to do this in bad or good weather; they are not hampered by rough seas since they can simply cruise below the turbulence (all-weather). The British nuclear submarines displayed this ability to maneuver several times: first, by getting to the maritime battlefield fast, and second, by being able to keep up with a surface group and maintain contact with them as the *Conqueror* did with the *Belgrano*. Another advantage of nuclear powered submarines is they do not need to go to the surface, this is also a characteristic of good maneuver ability. Diesel submarines share some of this ability to maneuver but are still tied to the surface; they need to surface or snorkel to charge their batteries periodically. They also do not have the high speed endurance of a nuclear powered submarine and thus may not be able to keep up with a fast moving surface ship. The only restrictions to maneuver for submarines are depth of the water and an artificially imposed application of operating areas. This artificiality was what Admiral Woodward was trying to remove when he was overridden by Northwood.

Offense. Submarines are offensive weapons. They were established as an offensive weapon during the naval treaty conferences following World War I. During the Washington Naval Treaty Conference in 1921 and 1922 one of the proposals put forth by the British was the abolishment of submarines. The basis for their argument was that since submarines were a purely offensive weapon and that countries should only possess defensive weapons, they should be abolished. This proposal was never accepted; nonetheless, the offensive nature of submarines was officially established.³

However, modern submarines can be used in a defensive role also. The British submarines were in a defensive role prior to the surface forces arriving and after the sinking of the *Belgrano*. To use submarines in a defensive role, there must be the acknowledgment of their offensive power; the threat of an attack, using this offensive power to produce unacceptable losses for an enemy, yields this defensive power; the submarines act as a deterrent.

Objective. The objectives for submarines cover the tactical, the operation and strategic levels. It is used in a tactical sense when conducting an approach. The target is the tactical objective. If the sinking of a certain ship would change the operations of the enemy, as would the sinking of a British aircraft carrier in the Falklands War, that ship becomes an operational objective. The use of submarines for strategic objectives is almost solely done by ballistic missile submarines; their targets are strategic. The lack of a clear objective or one that cannot be achieved can also hurt submarine operations. The mission of the *San Luis* was not clear and her value in the Falklands War was wasted. If her objective had been to find and attack one of the two British aircraft carriers and she had been able to meet this objective, the course of the war would have changed.

Security. The inherent security of a submarine is higher than any other type of ship. By just steaming in her normal mode of operation (submerged) makes her movements difficult to follow, thus enhancing her security. You cannot attack what you cannot find. However, if a submarine does not remain submerged, security can be compromised. During the conflict the British learned of the *Santa Fe* approaching South Georgia "probably based on signal intelligence" and that she had landed men at Grytviken based on intercepting voice transmissions.⁴ The final downfall of the *Santa Fe* was when she was caught on the surface (outside of her secure environment) by a British helicopter. *San Luis* also risked detection when she made firing reports after each of her attacks. The British submarines also transmitted but the Argentines did not have sensors present to detect these transmissions. By coming to the surface or to periscope depth and making their presence known (by radio transmission) each side risked the security of their submarines.

Economy of Force. This is where submarines shine; "there is no more cost effective weapons platform than the submarine." They are small, compact, but carry a powerful punch. By operating submerged, submarines do not require many of the expensive self protection systems that surface warships require. To avoid most threats they just need to submerge. While a surface ship has to be concerned with defending against attack from missiles and bombs, submarines do not, unless they are on the surface as was the *Santa Fe* when she was attacked.

This relative immunity to attack also allows them to work unassisted. While a surface ship relies on escorts and auxiliaries whenever they cruise the submarine can patrol alone. It does not have the need for escorts for protection and the nuclear plant has no need for fuel from an oiler. Due to their small size, even diesel powered submarines are less dependent on fueling at sea than surface ships; the *San Luis* commanding officer stated that he could patrol for 60 days before needing to return to port for fuel and supplies.⁵

Submarines' physical size and the size of their crews are testimonies to their economy of force. The *Conqueror's* attack on the *Belgrano* pitted a 4900 ton submarine armed with only torpedoes and some small arms (rifles and pistols for guarding the ship in port) against a 13,645 ton cruiser with two helicopters, two quad Seacat missile launchers, fifteen 6 inch guns, eight 5 inch guns and two 40mm guns, protected with armor up to eight inches thick. Also in the fight were *Belgrano's* two escorts, the *A.R.A. Hipolito Bouchard* and *Piendrabuena*, both 3,320 ton destroyers armed with four Exocet launchers, six Mark 32 torpedo tubes, two forward firing Hedgehogs, six 5 inch guns and four 3 inch guns.⁶ The *Conqueror* sank the *Belgrano* and also hit one of the destroyers with just three World War II vintage torpedoes. There were over 1600 personnel on the Argentine warships compared to the 103 personnel on the *Conqueror*, another economy of force, this time in warriors. The sinking of the *Belgrano* led to the Argentine Navy returning to within 12 miles from the coast of Argentina. Thus one British nuclear submarine was able to control entire Argentine Navy. This must be considered economy of force.

On the Argentine side the submarine *San Luis* was free to patrol and this caused the British task force to be on the defensive at all times. The British expended "most of their ordnance on suspected contacts -- most of which were false contacts caused by the ocean's many anomalies."⁷ The British ships present to counter the Argentine submarine threat were: one carrier, eleven destroyers, five nuclear powered submarines, one diesel submarine, and over 25 helicopters.⁸ Even though no ships were sunk by the *San Luis*, this is an impressive amount of ships to be tied up by one diesel powered submarine. This is more impressive considering that she was not even hit by the British force.

Mass. Having just completed a case for submarines being economy of force weapons it is hard to present a case for them using the principle of mass. However, the use of German submarines in wolf packs in World War II showed that submarines are capable of mass. The other "mass" that modern submarines bring to the fight is the ability to deliver a mass of firepower. Modern weapons carry a larger payload than those in the past. Even the type of anti-ship weapons they carry have the mass of firepower.

Torpedoes are the preferred weapons to sink ships. It is a lot easier to sink a ship by putting a hole in the bottom (torpedo) and letting in water than to put a hole in the top (missile or bomb) and letting in air. Torpedoes are designed to create a pocket of gas below the ship that will stress and break the keel of the ship. Once the breach is made in the ship it will most often quickly sink. This is what happened to the *Belgrano*. Problems with the arming of the torpedoes on the *San Luis* prevented her shots from causing large breaches in the bottom of her targets and thus they did not sink.

Unity of Command. Here we come to a principle where submarines often come up short. Since their strength is in conducting independent operations they do not support the unity of command principle well. The submarine commanding officers must be briefed well on their commander's intent since there is no real ability to provide midcourse guidance on many missions. In past conflicts, submarines have been allowed to patrol independently and by their combined efforts they have contributed to the unity of command by fighting for the same overall cause. This was true for the

United States submarines in the Pacific in World War II and the German U-boats in the Atlantic. They did not have unity of command, but the missions they performed supported the overall war objectives.

More emphasis lately has been placed on having submarines work directly with battle groups; working for the battle group commander directly. This is the type of arrangement that Admiral Woodward wanted during the Falklands War but did not get; the control of submarines remained at Northwood. When Admiral Woodward wanted the *Conqueror* to attack the *Belgrano* he had to go through Northwood, even though the attack supported his operations in the South Atlantic directly.⁹ This lack of unity of command made the orders to the submarines follow a complex chain of command and reduced the efficiency and delayed the timing of the submarine operations.

For the Argentines the unity of command was especially important. Since they had a smaller force they must make all their ships and airplanes count. They attempted to do this with their "fleet in being" concept that would only allow an engagement when the odds were in their favor. The rest of the time they were to remain aloof and wait for a target of opportunity. Their submarine was an independent operator and did not integrate with the whole effectively.

Surprise. This is a major advantage of a submarine: the submarine's stealth. Many times the target ship does not even know that he is a target until he hears and feels the explosion of a torpedo beneath his keel. Submarines can also be equipped with cruise missiles and can be stationed close to a country's coast to shorten the flight time such that even a prepared enemy will not be able to counter the threat. The fear of a surprise is what keep the British anti-submarine forces searching for the *San Luis*. The attack on the *Belgrano* was not only a surprise to that ship, but to the country of Argentina and to much of the world. The fear of another surprise attack caused the Argentine Navy to remain out of harms way for the remainder of the conflict.

Simplicity. In the Second World War the operations of submarines were simple; go to a patrol area and sink ships, pick up downed aviators, or conduct lookout duty. Much of what is done today is very similar. Independent operations lead to simplicity. It is only when submarines begin operating with other ships that the simplicity begins to wane. Battle group operations and land attack missions

move the submarine in to a more complex world. This was seen during Desert Storm in the coordinated launching of Tomahawk cruise missile by submarines, airplanes and surface ships.

The submarine launched weapons during the Falklands War were just torpedoes and thus the submarine operations were fairly simple. The submarines on both sides were assigned patrol areas and given the mission of sinking enemy ships or being a lookout. Only the long chain of command from the British task force commander to the submarines was complex, as were the volatile rules of engagement. Even Admiral Woodward's proposed alternate plan for employing the submarines was fairly simple and could have been executed effectively.

Summary. All of the principles of war apply to submarines. Some are a better fit than others and the mission of the submarine will affect which principles are more appropriate. The principles were used by both the Argentine and British submarines during the conflict and this helped their operations to succeed. However, some principles were ignored and this cost the fulfillment of missions on both sides of the conflict. The application of each principle must be considered each time a task is assigned to determine how to best apply them. There must also be a thoughtful look at the mission assigned to see, even if the appropriate weight is given to each of the principles of war, if the task is achievable and if not what additional resources will be required to make it achievable.

CHAPTER VII

ALTERNATE OPERATIONAL PLAN SUGGESTIONS

Argentine Operational Alternatives. To suggest a reasonable alternative operational plan for submarines, an end that would have achieved the Argentine objective -- to get the British back to the negotiating table -- needs to be defined. The Argentines needed to make the conflict so painful for the British that they would seek an end of the conflict. Another strategy could be to make World opinion turn against the British and allow international pressure force the British to back down. This last possibility did not develop, especially after the British drafted Resolution 502. They presented Argentina as the aggressor and this opinion would be hard to change. Even if Argentina was seen by the World as the correct side, due to NATO commitments many countries including the United States would stand behind Britain. This leaves us the first strategy.

To make the conflict too painful for the British, the Argentines could either make the conflict costly in material or in people. In both of these cases a good way to achieve results with an economy of force would be to attack the more valuable ships in the British task force. They could try to sink a British aircraft carrier (material) or a troop transport (personnel). Since the Argentine fleet had been bottled up along the coast, the attacking platform would have to be a submarine or an airplane. Raids tried by airplanes did not yield the results and the missiles used were somewhat indiscriminate; the missiles usually hit closest target, not the biggest. On the other hand, a submarine could identify its target visually before shooting a torpedo and the geometry of the shot could be made to assure that the desired target would be the one hit. An attack by the submarine *San Luis* was the best option.

The difficulty was to get the *San Luis* in position to be able to attack one of the aircraft carriers or a troop carrier. Since the submarine had a limited search radius, she would have to get assistance from another platform. Since no useful satellite imagery was available to the Argentines, their best platform for searching large ocean areas was an airplane. Reconnaissance flights could have been flown to find the desired target and the submarine could have been vectored to this target. This would have involved more unity of command (jointness) than was used during the war. A diesel submarine

working alone searching for a certain ship in a vast ocean area will not find that ship unless the submarine is either very lucky or it receives outside intelligence. The Argentines could not count on luck; they had to use all their assets wisely to achieve their strategic goals. If the combination of air power assisting a submarine had existed, an attack on the desired target could have occurred. Given the difficulties with the SST-4 torpedoes, Mark 37 torpedoes or a combination of the two types of weapons could have been used against the target to assure a hit.

For the selection of the target, consideration must be given to the effect of the attack on the British government and the ability to replace the loss. The loss of an aircraft carrier was Admiral Woodward's biggest fear, he felt that if he lost one he would not be able to continue the war unaided. Since there were no ready replacements and the loss of an "airfield" and associated airplanes, this should be the target of choice. The other choice of a troop carrier, even the large cruise liners that were supporting the war effort did not have the same advantages. More troops could be made available in a short amount of time and another transport could be arranged. This would simply delay the landing and reinforcement of British troops on the islands for the land war. Hitting the aircraft carrier would significantly weaken the task force with no hope of British replacement. The results of the overall conflict may have not changed, the United States may have entered to assist their NATO partner, but the nature of the war certainly would have.

Another major flaw in the submarine operations was when the *Santa Fe* got caught on the surface. By using radios and not leaving before daylight, the Argentine submarine displayed poor operational security and gave up the inherent security of the sea. The use of a submarine as a cargo and passenger carrier, unless they are to be delivered covertly (i.e., commando reconnaissance party and required supplies), is not an effective use of this platform. The use of the *Santa Fe* in this role together with the tactical errors committed while conducting the transfer cost the Argentines half of their operational submarine fleet.¹

The patrol area assigned to the *Santa Fe* can also be questioned. She was to patrol between South Georgia and the Falklands. Since the ideal targets for submarines would be around the Falkland

Islands, she could never have achieved contact unless the British task force came to South Georgia. A better patrol area would have been near the Falkland Islands. An area near the *San Luis* would have almost doubled the chances of finding the British ships. When the British had started their landing at San Carlos, the two submarines could have been notified and sent in to find the British carriers.

British Operational Alternatives. The main objective for the British once they had committed themselves to a military solution was well stated by General Moore, the commander of the ground forces: "Only the land forces could win the war, but the Navy could always lose it."² Thus the objective for the navy would be to not lose the war, which translated in Admiral Woodward's mind as "do not lose an aircraft carrier." To this end he had a good defense for any air or surface attack, but the defense against a submarine threat did not appear to be as thorough. This is clearly shown by the fact that the one Argentine submarine that was on patrol was not sunk or chased out of the "war zone." Even given the intelligence that the submarine's anti-surface torpedoes would not be able to arm, a better defense should have been created. The *San Luis* did have Mark 37 torpedoes that could have been used against a carrier.

To provide a better defense, one or two nuclear powered submarines could have been used in a screen around the carriers. The operating area for the carriers could also have been changed by large distances frequently to not allow a slow diesel submarine to keep up. This would also allow the use of the British submarines to sanitize an area before the carriers' arrival. By having two or more submarines work together one could do the sanitization while the other could search along the track of the carriers to search for a submarine that would be trying to catch up with the carriers.

Conclusion. In all of these alternatives, submarines acted as a force multiplier much the same way that special forces multiply the effects of conventional forces. The Argentines have learned the value of submarines and are increasing the size of their submarine force. The technology and shipyards to build this new submarine fleet is available in Argentina now. Argentina, like the Germans in World War II, made the mistake of starting a war with Britain with too few submarines and this is a major factor in the outcome of the war. Argentina feels that the sovereignty of the Falkland Islands has

not been fully resolved and is ensuring that they will have the proper equipment on hand for any future entanglements.³ Submarines are the weapon of choice since "in the oceans adjacent to South America, surface vessels are no real match for submarines."⁴

Along with acquiring hardware the Argentines must learn new ways of employing their submarines. They will have to write their doctrine to use a combination of platforms to get the best "bang for the buck." Submarines and aircraft will need to practice conducting joint operations to take full advantage of the benefits each platform has to offer.

The British learned that their nuclear powered submarines "were flexible and powerful instrument throughout the crisis, posing a ubiquitous threat which the Argentines could neither measure nor oppose."⁵ They also learned the difficulty of conducting antisubmarine operations in the ocean environment of the South Atlantic. Given the politics at the time it is easy to see why the British entered the conflict, but would they enter a conflict over the same Falkland Islands today? With the lessons they learned on the difficulty of finding a diesel powered submarine in the waters around the Falkland Islands and the build up of the Argentine submarine force, in the future it may be the British that hesitate to place their warships in harms way.

NOTES

Chapter II

1. Rubén O. Moro, The History of the South Atlantic Conflict The War for the Malvinas (New York: Praeger Publishers, 1989), p. 8-10.
2. Carl von Clausewitz, On War (Princeton: Princeton University Press, 1976), pp. 88-89.
3. Falkland Islands Campaign Understanding the Issues (Washington: National Defense University, 1986), 1v, p. 30.
4. Falkland Islands Campaign Understanding the Issues, p. 49.
5. Moro, p. 41.

Chapter III

1. Harry D. Train, "An Analysis of the Falkland/Malvinas Islands Campaign," Naval War College Review, Winter 1988, pp. 33-50.
2. Sandy Woodward, One Hundred Days The Memoirs of the Falklands Battle Group Commander (Annapolis: Naval Institute Press, 1992), p. 123.
3. Woodward, p. 122.

Chapter IV

1. Robert L. Scheina, "Where Were Those Argentine Subs?" U.S. Naval Institute Proceedings, March 1984, p. 115, and Robert L. Scheina, "The Malvinas Campaign," U.S. Naval Institute Proceedings, May 1993, p. 109.
2. Falkland Islands Campaign Understanding the Issues, p.101.
3. Scheina, "Where Were Those Argentine Subs?", pp. 115-116, and Scheina, "The Malvinas Campaign", p. 109.

Chapter V

1. The information on *Santa Fe* operations comes from Scheina, "Where Were Those Argentine Subs?", pp. 115-116. The descriptions of the attack on *Santa Fe* is covered in both David Brown, The Royal Navy and the Falklands War (Annapolis: Naval Institute Press, 1987) pp. 101-103, and Martin Middlebrook, Operation Corporate: The Falklands War, 1982 (London: Viking, 1985), pp. 109-111.

2. The information on *San Luis* operation come from an interview with the Commanding Officer presented in Scheina, "Where Were Those Argentine Subs?", pp. 117-120.

3. Moro gives a report on page 122 that the *H.M.S. Exeter* had been holed by a torpedo and was forced to return to shipyard for repairs. It would have had to happen during this attack or the one on 10 May, but *Exeter* had not arrived in the area until mid May (Woodward, p. 217). The British admit to a torpedo bouncing off one of their ships, but not to a ships hull being punctured.

4. Edwyn Gray, The Devil's Device Robert Whitehead and the History of the Torpedo (Annapolis: Naval Institute Press, 1991), p. 240.

5. Moore and Compton-Hall state that "...only lack of continuation training and misuse of torpedoes -- against clear German advice not to fire from deep -- that prevented the 1,285-ton Argentinian [sic] *San Luis* from robbing the British Task Force of valuable ships during two approaches in the Falklands War of 1882." in John E. Moore and Richard Compton-Hall, Submarine Warfare (Bethesda,: Adler & Adler, 1987), p. 4.

6. The information on *Spartan* and *Splendid* operations comes from Middlebrook, v.p.

7. The information on *Conqueror* operation comes from Middlebrook, v.p., and information on the attack on the *General Belgrano* is covered by most writings in the bibliography.

Chapter VI

1. Middlebrook, p. 98.

2. Phoenix, "Nuclear Submarines and the Principles of War." The Submarine Review, July 1988, pp. 4-5.

3. W. T. Mallison, Jr, Studies in the Law of Naval Warfare: Submarines in General and Limited Wars (U.S. Naval War College, International Law Studies 1966) (Newport: Naval War College, 1968), v. 58, pp. 36-37.

4. Middlebrook, p.108-109.

5. Scheina, "Where Were Those Argentine Subs?", p. 117.
6. Bryan Perrett, Weapons of the Falklands Conflict (Dorset: Blandford Press, 1982), pp. 36-37.
7. Phoenix, p. 6.
8. Perrett, pp. 20-24.
9. Admiral Woodward states in his book on pages 153-156 that he actually ordered the *Conqueror* to attack *Belgrano* himself but the order had been intercepted prior to reaching the *Conqueror*. Permission to attack did eventually come from London.

Chapter VII

1. CDR Kenny explained that the submarines mission was to patrol near South Georgia. Since it was headed that way the delivery of passengers and cargo was a matter of convenience. The delivery is not at issue here, just the manner in which it was done. If the transfer had occurred such that the submarine was only surfaced in darkness and no radio transmissions were made the *Santa Fe* may have gone on to make her patrol and in turn helped more in the Argentine war effort.
- 2.. Quoted in Woodward, p. 104.
3. The Argentines have two new TR 1700 diesel submarines (these are twice as big as the Type 209s and have a greater endurance) and are 80% and 40% complete on two more that they are building themselves. Discussions with CDR Kenny indicate that they should be able to fund the completion of these two submarine in the next few years. Argentine maps of Argentina show that the Malvinas (Falkland Islands) belong to Argentina. Argentina is still not willing to admit that the islands belong to Britain.
4. Juan Carlos Murguizur, "The Future of the Submarine in Argentinean Naval Policy," International Defense Review, April 1984, p. 452.
5. Secretary of State for Defense (UK), The Falklands Campaign: The Lessons (London: Her Majesty's Stationary Office, 1982), p. 17.

BIBLIOGRAPHY

- Brown, David. The Royal Navy and the Falklands War. Annapolis: Naval Institute Press, 1987.
- Cable, James. Gunboat Diplomacy 1919-1979. 2nd ed. New York: St. Martin's Press, 1981.
- Coll, Alberto R. and Arend, Anthony C., ed. The Falklands War: Lessons for Strategy, Diplomacy and International Law. Winchester, Mass.: Allen & Unwin, 1985.
- Ditzler, Brent A. "British Submarine Diplomacy: The Falklands Crisis." The Submarine Review, April 1993, pp. 48-56.
- Falkland Islands Campaign Understating the Issues. Washington: National Defense University, 1986.
1v.
- Gray, Edwyn. The Devil's Device Robert Whitehead and the History of the Torpedo. Annapolis: Naval Institute Press, 1991.
- Hasting, Max and Jenkins, Simon. The Battle for the Falklands. New York: W. W. Norton & Company, 1983.
- Holland, W.J. Jr. "SSN: The Queen of the Seas." Naval War College Review, Spring 1991, pp. 113-124.
- Interview with CDR Alejandro Kenny, Argentina Navy, Argentine Research Fellow, Strategy and Campaign Department, Center for Naval Warfare Studies, Naval War College, Newport, Rhode Island: 28 January 1994.
- Interview with CDR Stephen R. Kirby, Royal Navy, Student, Naval Command College, Naval War College, Newport, Rhode Island: 27 January 1994.
- Lokkins, Craig J. "The Falklands War: A Review of the Sea-based Airpower, Submarine and Anti-submarine Warfare Operations." Unpublished Research Paper, U.S. Air University, Maxwell Air Force Base, Alabama, 1989.
- Mallison, W. T. Jr. Studies in the Law of Naval Warfare: Submarines in General and Limited Wars (U.S. Naval War College, International Law Studies, 1966). Newport: Naval War College, 1968. 58v.
- Middlebrook, Martin. Operation Corporate The Falklands War, 1982. London: Viking, 1985.
- Moore, John E. and Compton-Hall, Richard. Submarine Warfare. Bethesda, Adler & Alder, 1987.
- Morison, Samuel L. "Falklands (Malvinas) Campaign: A Chronology." U.S. Naval Institute Proceedings, June 1983, pp. 119-124.

Moro, Rubén O. The History of the South Atlantic Conflict The War for the Malvinas. New York: Praeger Publishers, 1989.

Murguizur, Juan Carlos. "The Future of the Submarine in Argentinean Naval Policy." International Defense Review, April 1984, pp. 451-454.

Perrett, Bryan. Weapons of the Falklands Conflict. Dorset: Blandford Press, 1982.

Phoenix. "Nuclear Submarines and the Principles of War." The Submarine Review, July 1988, pp. 3-12.

Phoenix. "Submarine Lessons from the Falklands War." The Submarine Review, April 1983, pp. 35-43.

Scheina, Robert L. "Where Were Those Argentine Subs?" U.S. Naval Institute Proceedings, March 1984, pp. 115-120.

Scheina, Robert L. "The Malvinas Campaign." U.S. Naval Institute Proceedings, May 1993, pp. 98-117.

Interview with CDR Jonathan C. Scoles, Royal Navy, Department of Joint Military Operations, Naval War College, Newport, RI: 27 January 1994.

Secretary of State for Defense (UK). The Falklands Campaign: The Lessons. London: Her Majesty's Stationary Office, 1982.

Train, Harry D. "An Analysis of the Falkland/Malvinas Islands Campaign." Naval War College Review, Winter 1988, pp. 33-50.

Woodward, Sandy. One Hundred Days The Memoirs of the Falklands Battle Group Commander. Annapolis: Naval Institute Press, 1992.

United States Navy. *Office of Program Appraisal*. Lessons of the Falklands. Summary Report. Washington: 1983.