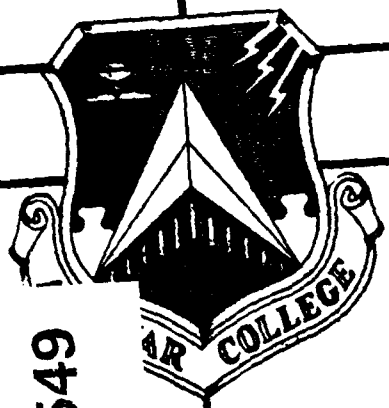


DTIC FILE COPY

1



AIR WAR COLLEGE

RESEARCH REPORT

AD-A217 549

THE FALKLANDS WAR: A REVIEW OF THE SEA-BASED
AIRPOWER, SUBMARINE AND ANTI-SUBMARINE
WARFARE OPERATIONS

COMMANDER CRAIG J. LOKKINS, USN

DTIC
ELECTE
FEB 06 1990
S D D 1989



AIR UNIVERSITY
UNITED STATES AIR FORCE
MAXWELL AIR FORCE BASE, ALABAMA

APPROVED FOR PUBLIC
RELEASE; DISTRIBUTION
UNLIMITED

AIR WAR COLLEGE
AIR UNIVERSITY

THE FALKLANDS WAR: A REVIEW OF THE SEA-BASED
AIRPOWER, SUBMARINE AND ANTI-SUBMARINE
WARFARE OPERATIONS

by

Craig J. Lokkins
Commander, USN

A DEFENSE ANALYTICAL STUDY SUBMITTED TO THE FACULTY

IN
FULFILLMENT OF THE CURRICULUM
REQUIREMENT

Advisor: Captain Ralph J. Castor, USN

MAXWELL AIR FORCE BASE, ALABAMA

May 1989

90 02 06 012

DISCLAIMER

This study represents the views of the author and does not necessarily reflect the official opinions of the Air War College or the Department of the Air Force. In accordance with Air Force Regulation 110-8, it is not copyrighted but is the property of the United States government.

Loan copies of this document may be obtained through the interlibrary loan desk of Air University Library, Maxwell Air Force Base, Alabama 36112-5564 (Telephone: [205] 293-7223 or AUTOVON 875-7223).

EXECUTIVE SUMMARY

TITLE: The Falklands War: A Review of the Sea-based Airpower, Submarine, and Anti-Submarine Warfare Operations

AUTHOR: Craig J. Lokkins, Commander, USN

Remarks on sea-based airpower, submarine, and anti-submarine warfare operations in the Falklands War of 1982. A review of the lessons learned regarding these operations as interpreted by the navies of the United States, Great Britain, and the Soviet Union. Commentary by the author with respect to these lessons learned and implications for the naval planner.

Handwritten signature



Accession For	
NTIS CRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

BIOGRAPHICAL SKETCH

Commander Craig J. Lokkins (M.B.A., University of San Diego) is an anti-submarine warfare pilot who has served in both the LAMPS MK I (SH-2F) and LAMPS MK III (SH-60B) communities. He has also served in the Air Department of an Amphibious Assault Ship (LPH). He has deployed five times to the Western Pacific and most recently served in the Arabian Gulf during Earnest Will convoy operations. Commander Lokkins is a graduate of the Air War College, class of 1989.

TABLE OF CONTENTS

CHAPTER	PAGE
DISCLAIMER	ii
EXECUTIVE SUMMARY	iii
BIOGRAPHICAL SKETCH	iv
I INTRODUCTION	1
II SEA-BASED AIRPOWER	4
Background	4
British Sea-Based Air Operations	5
Lessons Learned	6
Commentary	10
III SUBMARINES AND ANTI-SUBMARINE WARFARE	13
Background	13
British Submarine Operations	14
Argentine Submarine Operations	15
British Anti-Submarine Operations	16
Argentine Anti-Submarine Operations	17
Lessons Learned	17
Commentary	19
IV CONCLUSION	23
LIST OF REFERENCES	25
GLOSSARY	27

CHAPTER I

INTRODUCTION

On April 2, 1982, Argentine Marines landed on the Falkland Islands in the South Atlantic. Seized on behalf of Argentina who renamed them the Malvinas, the British and Argentines had disagreed over the island's sovereignty for over 100 years. Despite earnest efforts to solve the crisis diplomatically, Great Britain felt compelled to respond with military force. On June 14, 1982, Argentine forces on the Falklands surrendered to the British commander.

Although a short and localized conflict, the Falkland Islands War generated a remarkable amount of commentary, analysis, and lessons learned. Unfortunately, because of media exposure, much "instant analysis" by journalists formed the basis for public opinion regarding this conflict and its lessons. Foremost in this category were "popular" lessons learned regarding naval operations.

The Argentine invasion was considered in their strategy a method of expediting a diplomatic solution. Having occupied the islands with a small force, the Argentine leaders felt they could negotiate from a strong position. As they had carefully executed an operation whose rules of engagement demanded no loss of British life and minimum property damage, they felt until very late that

a diplomatic solution was probable. For this reason, a major logistics operation was not undertaken and the possibility of upgrading the Port Stanley airfield was not seriously considered. As events showed, this strategy was changed too late to deal with British military plans. (1:38-39)

The British strategy discounted a diplomatic solution. To reestablish control of the islands, they planned a four-phase naval strategy as follows: (1:39)

1. Enforce a 200-mile maritime exclusion zone with submarines until the arrival of surface forces.

2. Establish air and sea superiority in preparation for the landing.

3. Establish a beachhead, support the troops ashore and protect them from air attacks.

4. Support the land war and protect the sea lines of communication (SLOC).

The war followed these phases, but the British did not achieve all the planned results.

It is an important war for naval planners to study for many reasons, including the following: (2:23)

-- it saw the first combat use of nuclear powered attack submarines and vertical/short take-off and landing (V/STOL) aircraft.

-- it was the first time since World War II that naval forces were subjected to sustained air attack.

-- modern cruise missiles were used against warships of a major navy for the first time.

-- it was a conflict between two Western nations using Western equipment.

Although this conflict produced numerous valuable lessons for naval planners, this study will focus on two of the most important areas, sea-based airpower and submarine and anti-submarine warfare (ASW). By reviewing the lessons of the conflict regarding these operations, implications for today's naval planner will be presented.

CHAPTER II
SEA-BASED AIRPOWER

Background

The Falklands War intensified the never-ending debate between large carrier and small V/STOL carrier enthusiasts. There was almost universal recognition, however, of the role the British carriers played in the conflict. Without the air assets the carriers provided, retaking the Falklands would probably have proved unrealistic without initiating general war (i.e., unrestricted submarine warfare, bombing of Argentina itself, etc.).

The British task force included the following carriers: (3:346)

<u>Name</u>	<u>Displacement</u>	<u>Aircraft Deployed at Beginning of Conflict</u>
Hermes	28,700 tons	12 Sea Harriers, 18 Sea Kings
Invincible	19,810 tons	8 Sea Harriers, 15 Sea Kings

The Argentine carrier, Veinticinco De Mayo, did not participate in operations against the British task force. It did, however, provide air cover for Argentina's invasion of the Falklands.

British Sea-based Air Operations

The two British carriers entered the operational area near the Falklands on April 25, 1982, with combat sorties first taking place on May 1, 1982. Sea Harriers were used both in air defense and close air support (CAS) roles. Sea Harriers in the air defense role were equipped with two AIM-9L Sidewinder missiles and two 30mm Aden cannons. These missions lasted 90 minutes, which allowed only 20 minutes of actual on-station time. Later in the conflict, Royal Air Force (RAF) Harrier GR-3 aircraft, primarily ground support assets, deployed onboard Hermes. Eventually, a total of 28 Sea Harriers and 14 RAF Harriers were deployed to the South Atlantic. The Sea Harriers flew over 1100 air defense missions and 90 CAS sorties, while the RAF Harriers flew in excess of 125 CAS sorties. (2:27)

Sea Harriers performed well in the air defense role with 20 confirmed and three probable kills, of which 16 and one respectively were attributable to Sidewinder AIM-9L missiles. No Harriers were destroyed by Argentine aircraft. Harriers in the CAS role were of limited effectiveness. Ten Harriers were destroyed, four to enemy groundfire, five to operational accidents, and one to a Roland surface-to-air missile. (4:19) Because the task force lacked Airborne Early Warning (AEW) assets, low-

flying enemy aircraft were difficult to detect making it prudent for the carriers to operate well east of the Falklands, limiting the patrol time of the Sea Harriers.

Poor AEW capability was a result of the austere budgets of Great Britain in the 1960s and 1970s. These carriers were intended to be used as ASW platforms in the NATO environment, not as power projection vehicles. In the NATO scenario they would rely on land-based or US carrier-based AEW assets for needed warning information.

Lessons Learned

It is interesting to note that if Argentina had postponed the invasion only 18 months, the British would have had no available sea-based airpower. HMS Invincible had already been sold to Australia in February 1982 and HMS Hermes was due for retirement in 1983. (5:44) Following the conflict, the British government announced that, "two carriers should be available for deployment at short notice. To ensure this, a third carrier will be maintained in refit or reserve and we shall not proceed with the sale of HMS Invincible." (4:33) This British policy turnaround certainly highlights the advantages derived from sea-based airpower. The British government also announced the fitting of Searchwater AEW radars to Sea King helicopters to provide a moderate AEW capability and improved Sea Harriers with greater endurance. These upgrades together

represent a significant improvement in British sea-based air defense capability and provide for a more viable forward presence without US or NATO assistance.

The US Navy firmly believed that the British experience vindicated their insistence on maintaining a force of large carriers and their very capable associated air wings. A US carrier could field E-2 Hawkeye AEW aircraft to provide around-the-clock early warning of hostile air attack. These same aircraft could then control the air defense F-14 Tomcat fighter aircraft for early intercept of attacking planes. As one US analyst wrote, "it is highly probable that if it had been our fleet in the South Atlantic, no Argentine aircraft would have gotten closer than 50 miles to our ships. Probably not a single hit would have been scored, and not one ship would have been sunk." (6:895)

Attitudes in the Soviet Union regarding aircraft carriers had changed already in the years prior to the Falklands conflict. In the 1970s, references to the "obsolescence" or inevitable "extinction" of aircraft carriers gave way to positive evaluations noting the importance of sea-based aviation to warfare at sea. (7:5) The question became for the Soviets not whether to have carriers, but what type? Recognizing the limitations of V/STOL aircraft, it seemed only a matter of time before

they built a large carrier capable of embarking conventional fixed-wing aircraft.

The Falklands War, however, seemed to revive Soviet interest in V/STOL carriers due to British Harrier performance in the battle for air superiority. The maneuverability and basing flexibility of the Harriers were widely praised by the Soviets (7:10) The Soviet V/STOL aircraft, the YAK-36 Forger, was clearly inferior to the British Harrier, however, lacking equivalents to the Blue Fox radar, vectored-thrust maneuverability, and AIM-9L missiles. (8:83) Soviet improvement in V/STOL technology was clearly needed. Soviet calculations gave the Argentines a three-to-one advantage in fighter-bombers over the British. But because of the proximity of the carriers to the combat zone, the Soviets computed the sortie generation rate as four-to-one in favor of the British, certainly a strong argument in favor of sea-based airpower. (9:145)

These comments regarding V/STOL aircraft, however, did not reduce the Soviets' strong belief in land-based naval aviation. The Soviets were impressed with the damage inflicted by the Argentines on the British task force, although they were dismayed at the level of Argentine training. Admiral Kapitanets (Commander-in-Chief Baltic Fleet) stated that, "the conflict confirms one other

essential factor of naval warfare--the need for preparing land-based aviation for interaction with combatants and with deck-based multi-mission flying craft, as well as for independent actions against enemy combatants at sea and in bases." (10:55) The Soviets have come to believe in aircraft carriers for air superiority only when land-based airpower is unavailable, perhaps reflecting their historical lack of need to project power overseas.

Much has been written about the superiority of the Harrier in air-to-air combat in the Falklands War. The number of kills scored by the Harriers is impressive. The story of the actual air combat is most enlightening.

Two factors assured Harrier victories against the Argentines. Air-to-air missile differences were the first factor. The Argentine Sidewinders were AIM-9Bs, first generation weapons suitable only for attack from the rear. The British aircraft could make even head on attacks as they were equipped with the much more advanced AIM-9Ls. (9:148) A Falklands War historian asserts that, "in every case in which a [British] Sidewinder locked on, the enemy aircraft was destroyed." (3:207) The second factor assuring British success was the distance each Argentine aircraft had to travel from its land base to attack the British task force. Because of their critical fuel states, Argentine pilots did not seek aerial combat. One observer

noted that,

there were never dogfights in the conventional sense... the Harriers "viffing" technique of sudden deceleration, of which so much was made during speculation in the press about air combat, was never relevant. There was merely a struggle between the intercepting Harrier with its superb acceleration, and the enemy twisting and dodging to escape.... If the enemy used his afterburner to increase his speed, he merely provided a brighter target for the homing missile and ensured his own collapse from lack of fuel before he reached home. Air combat, from beginning to end, was an entirely one-sided affair, the enemy's inability to dogfight perhaps flattering the performance of the Sea Harrier a little. (3:207)

This V/STOL versus conventional fixed-wing confrontation was unique to the Falklands War and is not a good predictor of future battle. As one respected defense analyst observed.

V/STOL fighter capability was proven. Without it Britain could not have fought the battle, as both sides acknowledge. And yet this does not mean that conventional sea-based airpower is to be ruled out if it can be afforded. V/STOL proved that with a minimum of cash, sea-based airpower can be projected effectively, and maintained in a fluid front line. (11:155)

Commentary

All wars are different. Yet, the Falklands War had one feature, not likely to be duplicated in future conflicts, that played a decisive role in this conflict-- the distance that separated the Falklands from Argentina. As Admiral Stansfield Turner observed, "had the islands been 100 miles closer to Argentina, Argentina would very likely have won; or had they been 100 miles further away

from Argentina, Britain would not have suffered the losses it did in winning." (12:50)

British sea-based airpower was a very scenario dependent force. Naval planners and critics need to carefully evaluate the Falklands campaign before making a decision in the small versus large carrier controversy. The British carriers never obtained air supremacy and were fortunate indeed to be able to remain in attack-free operating areas protected by their distance from Argentina.

V/STOL carriers are certainly a welcome addition to any fleet, but not as air superiority and power projection platforms. V/STOL carriers are ideal, however, as amphibious assault ships such as US Navy LHD, LHA, and LPH class vessels. Amphibious assault and the requirement to operate from unprepared fields make V/STOL aircraft indispensable in that environment. But until technology enables V/STOL aircraft to have performance comparable to conventional fixed-wing aircraft, large carriers must always be the ships of choice for those navies requiring a maritime power projection capability.

The United States has made its choice in this carrier debate with the continued purchase of large nuclear-powered aircraft carriers. The rather limited force level of 15 carriers is troubling, however, in this era of continued Soviet naval modernization and growth. With the introduction of the SV-22 Osprey V/STOL aircraft

into the fleet in the 1990s, it would be advantageous to reestablish a class of ASW escort carriers (CVS) with SV-22 and SH-60 ASW aircraft embarked. These relatively low-cost (in comparison with CVNs) ships would be extremely useful in a sea control environment and could provide the larger carriers additional protection against the Soviet nuclear submarine threat.

CHAPTER III

SUBMARINES AND ANTI-SUBMARINE WARFARE

Background

In the Falklands conflict, submarines were engaged in conflict for the first time since World War II. Although not representative of a US versus Soviet conflict, valuable lessons were learned and confirmed in submarine and anti-submarine warfare.

Participants from the Royal Navy included:

Submarine Name (4:37)	Type	Characteristics (13:546-548)	
		Torpedo Tubes	Speed
Conqueror	Nuclear Attack (SSN)	6-21 Inch	28 Kts
Courageous	Nuclear Attack (SSN)	6-21 Inch	28 Kts
Spartan	Nuclear Attack (SSN)	5-21 Inch	30 Kts
Splendid	Nuclear Attack (SSN)	5-21 Inch	30 Kts
Valiant	Nuclear Attack (SSN)	6-21 Inch	28 Kts
Onyx	Diesel-Electric Attack (SS)	8-21 Inch	17 Kts

Participants from the Argentine Navy included:

Submarine Name (2:61)	Type	Characteristics (13:9)	
		Torpedo Tubes	Speed
Sante Fe	Diesel-Electric ATK (SS)	10-21 Inch	15 Kts
San Luis	Diesel-Electric ATK (SS)	8-21 Inch	22 Kts

The Argentines owned two additional diesel-electric submarines, one of which was another German-type 209 similar to the San Luis, but neither was available for operations during the conflict. (2:63)

British Submarine Operations

Three British nuclear attack submarines (HMS Spartan, HMS Splendid, and HMS Conqueror) deployed from European waters between March 30 and April 4, 1982. (4:7) They had quickly loaded stores and weapons, then proceeded at high sustained speeds to the Falklands area, a region approximately 8,000 miles from Britain. On April 12, the British imposed a maritime exclusion zone around the Falklands using the attack subs now on station to enforce this edict. On April 23, the British further warned that any threatening approach by Argentine forces would be dealt with appropriately. The blockade effectively stopped reinforcement of the Argentine garrisons by sea, as only one resupply ship arrived after the blockade was announced. (4:8) Most of the water of the blockade area is shallow (less than 100 fathoms) and is characterized by high ambient noise levels. (4:12) Considering the limited passive sonar ranges available in these waters, the effectiveness of the blockade is attributable to the deterrent effect of the nuclear submarines and the poor quality of Argentine ASW forces.

On May 2, 1982, the most decisive submarine event of the war took place. The Argentine cruiser General Belgrano and its two escort destroyers were located 225 miles southwest of the Falklands by HMS Conqueror. This Argentine force armed with Exocet surface-to-surface

missiles was considered a threat by the British. With the approval of higher authority, HMS Conqueror attacked the cruiser successfully with two MK-8 pre-World War II design torpedos. After the attack, Conqueror easily evaded the Argentine destroyers. There is no evidence that they ever had contact on Conqueror. (4:8) Realizing the ineffectiveness of their ASW capability and the need to preserve their fleet, the Argentine surface navy never ventured beyond 12 miles of the Argentine coast (as permitted by the British total exclusion zone of May 7) for the remainder of the war. (14:121)

British submarines also served as early warning platforms against Argentine air attacks. The submarines patrolled the Argentine coast and provided useful information about Argentine air operations to the British task force. Although inefficient, this operation provided information not otherwise available to British surface forces. (4:9)

Argentine Submarine Operations

Although less successful than the British operations, the Argentine submarine operations that took place during the conflict are worthy of study by naval planners.

The Argentine submarine Sante Fe evaded detection by HMS Conqueror in the South Georgia area. It remained undetected until it surfaced at the main port of Grytvihen.

It was discovered and attacked by British helicopters armed with AS-12 wire-guided missiles and depth charges. The badly damaged submarine was beached after the boat's watertight integrity was destroyed. (4:8)

Of more interest were the operations of the Argentine submarine San Luis, a modern German-built conventional submarine. It made a patrol of 36 days during the conflict and reportedly located and operated in the area of the British task force for several days. The Argentines claim they fired torpedos at the British carrier Invincible, but were unsuccessful because of faulty main and backup torpedo fire control panels. (2:61-63)

British Anti-Submarine Operations

The British navy is primarily an ASW fleet whose mission consists of keeping open NATO's sea lines of communication (SLOC). The task force in the Falklands included many modern ASW surface ships and helicopters. Yet, the very limited Argentine submarine threat caused much concern for the British. Despite expending virtually every ASW weapon in the task force, the British were unable to destroy the San Luis which operated in their area for several days. (1:40) As discussed earlier, the other Argentine submarine was destroyed on the surface, after having gone undetected by the British submarine Conqueror. No information on possible ASW operations by British submarines was found.

Argentine Anti-Submarine Operations

No evidence was found to indicate that the Argentines attempted any ASW operations after the Belgrano incident. The lone Argentine carrier did carry S-2 and SH-3 ASW aircraft, but as previously mentioned did not participate in the war. No information regarding land-based ASW operations using these aircraft was discovered. The Argentine submarine on patrol concentrated on anti-task force operations.

Lessons Learned

Analysts were united in their unabashed enthusiasm for the value of the British nuclear submarines in the Falklands conflict. The official British account of the war noted that, "the SSN's were flexible and powerful instruments throughout the crisis, posing an ubiquitous threat which the Argentines could neither measure nor oppose." (4:17) Official US Navy comments noted that its attack submarine force could operate in a similar manner to the British and additionally "provide direct support to carrier battle groups, increasing their ASW effectiveness." (2:63) Soviet naval leaders also praised the effectiveness of the nuclear submarines, noting that the Argentine navy was forced to operate in coastal waters, "confirming the preeminence of nuclear-powered submarines in offensive naval combat." (15:92) The Soviets also observed that submarines allowed the British to sustain

an effective blockage to the west of the Falklands where British surface combatants faced extreme risks from Argentine air attacks. (16:18)

Analysts were less unified in their opinion of conventional submarine operations. The British government did not discuss in their official account of the conflict the role of their conventional submarine, HMS Onyx. A Soviet article, however, stated that HMS Onyx was part of the British surface force ASW screen (16:18), arriving in the Falklands area May 28. (3:399) The US Navy recognized the threat caused by the Argentine submarine on patrol, stating that "the loss of a British aircraft carrier or troop transport to submarine attack might well have curtailed the entire British effort." (2:63)

As for anti-submarine warfare operations, the British tersely commented that, "the operations highlighted the difficulty of conducting ASW in shallow water." (4:23) The US Navy felt that the British ASW activities may have deterred Argentine submarine attacks. Noting that the "water conditions in the Falklands area were very poor for acoustic detection," the US Navy states that US naval forces "would have the advantages of carrier-based S-3 Viking fixed-wing ASW aircraft" and "large numbers of US cruisers, destroyers, and frigates with high-powered active sonars and towed, passive acoustic arrays which would have been more effective in the Falklands environment." (2:36)

The US Navy also commented that "the British expended ASW ordnance at a higher rate than planning factors had indicated," which with the expenditures of air-launched sonobuoys "are of particular concern to the U.S. Navy." (2:36)

All observers agree that Argentine ASW operations were poorly coordinated and completely ineffective. An Argentine analyst commented that, "all the years of UNITAS exercise in conjunction with the U.S. Navy and those of Latin America had been for nought." (17:116)

Commentary

All navies had to be impressed with the effectiveness of the British nuclear attack submarines. Fast, difficult to detect, and deployable for long periods, these assets absolutely dominated the Argentine surface navy. Although unstated in official reports, but predictable considering their lack of ASW success, the British surface navy would also have been dominated by nuclear submarines in this conflict had they been available to Argentina. In reality, had the torpedo firing panel of the Argentine submarine San Luis been operational, the results of the war may have been significantly different. The British could ill afford to lose even one of its carriers or major troop transports.

The US Navy notes its more capable ASW systems and confidently addresses the submarine threat to its

fleet. In fact, however, the British ASW assets available during the conflict were not significantly different from those the US would utilize in similarly restricted waters. Certainly against an inherently quiet diesel-electric submarine, whether in restricted waters or not, active prosecution of the target provides the greatest chance of success. Yet in its lessons learned, the US Navy curiously mentions the availability of S-3 Viking aircraft and towed array systems, both primarily passive systems, as being effective in these circumstances. Nuclear submarines also depend on passive methods of conducting ASW. Yet, passive prosecution of diesel-electric submarines is largely ineffective especially in environmentally difficult waters such as those in the vicinity of the Falklands. The US Navy also mentioned active sonar prosecution by surface ships, when more realistically their beaconing is more useful at solving the submarines' targeting problem than for locating the submarine. Against the diesel-electric threat, the Sea King ASW helicopter with its high-powered active dipping sonar, has proven itself over many years to be the ASW platform of choice. Interestingly, the British fleet had far more Sea Kings available (18 on HMS Hermes and 15 on HMS Invincible versus 6 on US carriers) than would a US fleet. (3:346) Additionally, the magnetic anomaly detection (MAD) system used by all US ASW aircraft is ineffective against non-magnetic hulls of submarines

such as the German-type 209. (4:10) It seems, therefore, that British ASW capability against the submarine threat they encountered in the Falklands was comparable to that of the US fleet in that scenario. Superior US passive ASW capability, however useful in an open ocean environment against nuclear submarines, would not have been critical in the Falklands War.

The US fleet would have faced less threat from the submarine threat, however, because of its extended operating area. The longer range US carrier aircraft would have enabled the US carriers to have much more freedom of movement on the seas. This additional area would significantly increase the submarines' location and targeting problem.

As previously discussed, conventional diesel-electric submarines got little attention in the lessons learned of the major navies. This is no doubt a reflection of the lack of success of the Argentine submarines and perhaps the preeminence of nuclear submarines in the US, Soviet, and British navies. It is important, however, to emphasize the threat posed by diesel-electric submarines especially in restricted waters. Its quietness compared to nuclear submarines may make the conventional submarine under certain circumstances the greatest threat. The US Navy remains opposed to conventional submarines for its own missions, but states that, "this would not be the case if

it were not for well over 100 modern diesel-electric submarines in our allied navies which are available to carry out those responsibilities. (2:8)

The submarine has been and remains a great threat. Admiral Gorshkov observed that in World War II there were 25 allied ships and 100 aircraft involved in ASW operations for each submarine at sea. (18:10) Anti-submarine warfare results in the Falklands indicate this imbalance still exists.

CHAPTER IV

CONCLUSION

There were many useful lessons to learn from the Falklands campaign. Foremost was the confirmation of the decisive role of naval power, which allowed military force to be brought to an unanticipated remote battlefield. For Great Britain, the quintessential seapower, it reaffirmed lessons already known, but ignored in recent years for political and economic reasons.

The conflict highlighted the importance of sea-based airpower to surface navy and amphibious operations. The ability of Great Britain to deploy their small force of Harriers proved to be critical. With these assets, retaking the Falklands became possible in a limited war scenario. But because this small force was unable to obtain air supremacy, the British suffered serious losses, including the sinking of four warships. For the United States, this experience indicates its investment in large aircraft carriers is warranted. This lesson is not going unheeded by the Soviet navy either, as it continues to build more capable aircraft carriers of its own.

The role of the submarine in maritime battle was exercised for the first time since World War II. Not surprisingly, the British nuclear submarines completely dominated the Argentine surface navy. Not as widely known,

but of considerable importance, was the ability of one Argentine diesel-electric submarine to confound the anti-submarine warfare efforts of the British navy in the restricted waters of the Falklands. It appears that the number of ships and aircraft necessary to prosecute even one submarine is unacceptably high, a serious implication for naval strategists.

The war produced many lessons and much comment. For most familiar with modern naval warfare, the war reaffirmed things they already knew. For those not familiar with naval warfare, the war demonstrated the inherent flexibility of maritime power and the folly of not maintaining an adequate, forward-deployed, maritime deterrent.

LIST OF REFERENCES

1. Train, Admiral Harry D. "An Analysis of the Falkland/Malvinas Islands Campaign." Naval War College Review, Winter 1988, pp. 33-50.
2. United States Navy. Office of Program Appraisal. Lessons of the Falklands. Summary Report. Washington, February 1983.
3. Hastings, Max, and Jenkins, Simon. The Battle for the Falklands. New York, NY.: W.W. Norton and Company, 1982.
4. Secretary of State for Defence (UK). The Falklands Campaign: The Lessons. London: Her Majesty's Stationary Office, 1982.
5. Record, Jeffery. "The Falklands War." Washington Quarterly, Autumn 1982, pp. 43-51.
6. Housman, Damian. "Lessons of Naval Warfare." National Review, July 23, 1982, pp. 894-896.
7. Petersen, Charles C. "Aircraft Carrier Development in Soviet Naval Theory." Naval War College Review, January-February 1984, pp. 4-13.
8. Nutwell, Commander Robert M. "Postscript: The Falklands War." U.S. Naval Institute Proceedings, January 1983, pp. 82-83.
9. Bruner, Major Ralph M. "Soviet Military Science and the Falklands Conflict." U.S. Naval Institute Proceedings, December 1985, pp. 142-148.
10. Papworth, Lieutenant Commander Richard N. "Soviet Navy Reactions to the Falkland Islands Conflict." Naval War College Review, March-April 1985, pp. 53-72.
11. Copley, Gregory R. "A Summary of Lessons," Lessons of the South Atlantic War: Proceedings of the Conference on the Anglo-Argentine War of 1982. Washington: Defense and Foreign Affairs Ltd., 1982.
12. Turner, Admiral Stansfield. "The Unobvious Lessons of the Falklands War." U.S. Naval Institute Proceedings, April 1983, pp. 50-57.

13. Moore, Captain John, Editor. Jane's Fighting Ships, 1982-1983. Jane's Publishing Company Limited, London, 1982.
14. Morison, Samuel L. "Falklands (Malvinas) Campaign: A Chronology." U.S. Naval Institute Proceedings, June 1983, pp. 119-124.
15. Bruner, Major Ralph M. "Soviet Military Science and the Falklands Conflict." U.S. Naval Institute Proceedings, November 1985, pp. 90-95.
16. Kipp, Jacob W. Naval Art and the Prism of Contemporaneity: Soviet Naval Officers and the Lessons of the Falklands Conflict. College Station, Texas: The Center for Strategic Technology, Texas A and M University, 1983.
17. Scheina, Robert L. "The Malvinas Campaign" U.S. Naval Institute Proceedings, May 1983, pp. 98-117.
18. Ruhe, William J. "Submarine Lessons," Military Lessons of the Falkland Islands War--Views from the United States. Boulder, Colorado: Westview Press, 1984.

GLOSSARY

AEW	Airborne Early Warning
ASW	Anti-submarine Warfare
CAS	Close Air Support
RAF	Royal Air Force
SLOC	Sea Line of Communication
SS	Diesel-electric Powered Attack Submarine
SSN	Nuclear Powered Attack Submarine
V/STOL	Vertical/Short Take-Off and Landing