



The Sea King: A Narrative of Adaptability

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Introduction

The Sikorsky S-61 *Sea King* helicopter has had a long and distinguished career with the Canadian Armed Forces. Introduced on May 24, 1963, the helicopters have been in service for almost fifty years. The history of the helicopter can be divided up into two distinct periods, along the lines of their mission suite and their intended role in the global military environment. The first period coincides with the Cold War, as the helicopter was initially developed as an Anti-Submarine Warfare (ASW) helicopter, intending to counter the new Soviet nuclear ballistic-missile submarines of the late 1950s. To this end, the *Sea King* was central to Canada's pioneering of the helicopter-carrying destroyer (DDH) concept, which greatly extended the effective ASW range of these mainstay naval vessels. As the Cold War drew to a close, however, the global military environment shifted away from ASW operations and the second major period of the *Sea King's* history began. The Persian Gulf conflict acts as a dividing line between these two periods, as it was indicative of the new roles that the Canadian Navy and their DDHs would be fulfilling in international intervention. A testament to their durability and adaptability, six *Sea King* helicopters were quickly refitted to take on an surface surveillance operations role in order to assist in the blockade of Iraq. Since then, the operational tempo of the *Sea King* helicopters has dramatically increased, with operations being conducted both at home and across the globe. These operations largely reflect the new mission faced by the Canadian Navy, focusing on international intervention, humanitarian assistance, and disaster relief rather than the traditional ASW role of the helicopters.

In addition to the typical secondary sources, three oral history interviews will be assessed in this paper. The first subject, Colonel John Orr, flew *Sea King* helicopters during the Cold War, working his way up to command a squadron at CFB *Shearwater* and eventually being appointed

as the Maritime Air Component Commander (Atlantic) in 1997. The second, Colonel John McManus, served as a Tactical Co-ordinator (TACCO) in *Sea Kings* during the Cold War, responsible for both tactics and the flow of information in the helicopters during operations. Like Colonel Orr, he worked his way up through the ranks to command a helicopter squadron, and eventually being promoted to Commander of the Maritime Air Component (Pacific) in 2004. In addition, Colonel McManus was posted to the Helicopter Operational Testing and Evaluation Facility (HOTEF) in 1988, testing and evaluating new equipment for the helicopter fleet. The final subject, Lieutenant Colonel Ed Mitchell, spent his career conducting maintenance for the Canadian Forces as an aerospace engineer. His maintenance career saw him work on a variety of aircraft, including the *Sea King*, and he was eventually promoted to command the maintenance squadron at *Shearwater* in 1994. In addition, after he retired from the Canadian Forces, LCol Mitchell served in the private sector as the general manager of Coulson Aero Technologies, a firm that provided maintenance for the civilian version of the *Sea King* helicopter. Between them, these three gentlemen possess an unparalleled wealth of knowledge concerning the helicopter; with experiences extending as far back as the 1960s and as far forward as the 2000s, their insight added a new dimension to the research of this paper.

The Historiography of the *Sea King*

The length of service of the *Sea King* has resulted in a history that cannot be done justice by a single paper. The most prominent aspects to its narrative can be divided into four subgroups: tactical, strategic, technical, and political. The number of secondary works released on the *Sea King* is not particularly large, and consequently many of the publications within it

have strived to cover two, or in some cases three, of the above aspects. Unfortunately, none have been able to cover all four for the entire span of the *Sea King's* service life.

The author who came closest was Shawn Cafferky, in his book *Uncharted Waters* (2005).¹ In it, Cafferky covered the ASW helicopter's original integration into the fleet, specifically examining the development of the destroyer-escort capable of carrying an ASW helicopter and the acquisition of the *Sea King* helicopter to fulfill this role. His work included analysis of the strategic role of the helicopters, the technical issues of the new system and how they were overcome, and the political jockeying in both the private and public spheres necessary to acquire the *Sea King*. Tactics were given only cursory treatment, as the author focused more on the process of integrating the helicopter than how it would be used once adopted. The obvious limitation to this work, however, was its scope. Cafferky ended his analysis after 1964, leaving it up to other authors to forge ahead from there.

The political and public relations fiasco that has surrounded the replacement of the *Sea King*, especially concerning the cancellation of the New Shipborne Aircraft (NSA) Project in 1993, cast a long shadow over the work of Aaron Plamondon. In his book *The Politics of Procurement* (2010), the author took on the large and complicated political landscape surrounding the helicopter.² His timeline started in the same place as Cafferky – at the original acquisition and integration of the helicopter into the destroyer fleet – but Plamondon extended his scope much farther into the future, ending at the eventual decision to replace the *Sea King* within the last decade. The author held the venerable helicopter up as being emblematic of the issues in the Canadian military's procurement process, with particular emphasis on the

¹ Shawn Cafferky, *Uncharted Waters: A History of the Canadian Helicopter-Carrying Destroyer* (Halifax: Centre for Foreign Policy Studies, 2005).

² Aaron Plamondon, *Politics and Procurement: Military Acquisition in Canada and the Sea King Helicopter*, (Vancouver: UBC Press, 2010).

government's ability to interfere with military procurement and the disastrous effect that "political parrying" between political parties can have on the process. The resulting publication was heavily biased against the Liberal government of Jean Chretien and the Department of National Defence (DND). Though discussions on tactics and equipment were present in certain sections of his work, Plamondon's top-down political approach largely overshadowed them.

In *Certified Serviceable* (1995), Michael Whitby and Peter Charlton told the technical story of Canadian Naval Aviation, not limiting themselves to the narrative of the *Sea King* in particular.³ In the chapters built around the helicopter, they focused on the two most prominent technical aspects of the *Sea King's* history – the initial development of the *Beartrap* and DDH concept in the 1960s, and the helicopter's rapid change of mission suite for the Persian Gulf in 1990. The chapter on the Persian Gulf discussed the initial decision to send the helicopters with the Canadian Task Force, the modifications that were requested to make the aircraft more suited to the new role, the intense process of actually modifying the aircraft, and how the helicopters were finally used once they arrived in the Gulf. While it ably covered many of the technical aspects of the *Sea King*, this publication did not extend its analysis beyond the two major events in question. The authors did not examine the period between the integration of the ASW helicopter into the fleet and the Persian Gulf conflict, nor did they examine the post-Persian Gulf operations of the *Sea King*.

For the purposes of this paper, the narratives of those officers who were interviewed had to guide which questions would be asked and the subsequent direction that the paper would take. Their direct experiences were better suited to discussions of tactics and technical information, as opposed to the political and socio-economic history of the helicopter. In the end, these three

³ Peter Charlton and Michael Whitby, *Certified Serviceable: From Swordfish to Sea King* (Ottawa: CNATH Book Project, 1995).

officers were uniquely placed to discuss these aspects of the *Sea King's* service, and they offered valuable insight into subjects such as equipment, flight operations, tactical co-ordination, base organization and maintenance practices. Importantly, the interviews make up for some of the shortcomings of the secondary literature, filling in some of the gaps of the historical record to create a more complete picture of the *Sea King's* history. What follows is a narrative that attempts to cover the technical and tactical aspects of the *Sea King*, with some mention of the surrounding strategic context. It will combine research from the secondary literature with the interviews to examine just what made the *Sea King* so versatile and long lasting.

The Cold War and the *Sea King*

In terms of the strategic context, the end of the 1950s saw a transition in the way that naval warfare was fought. Against the backdrop of quickly developing nuclear and missile technology, the United States Navy (USN) launched the world's first nuclear powered submarine, the *Nautilus*, in 1954.⁴ The creation of a submarine that married unprecedented speed underwater, greatly extended operational endurance, and the capacity to fire nuclear-tipped missiles added a new dimension to naval operations in the North Atlantic. Nuclear missiles could now be launched from as close to shore as the submarine was able to approach, and they could do so with little warning. The creation of the Polaris missile system by the Americans in 1960-61 cemented this threat as a reality, and the Soviet Union followed suit with their Yankee class submarines.⁵ If nuclear war had ever broken out between the United States and the Soviet Union, the SSBNs of both nations that were operating at sea were impervious to the initial nuclear strike of an aggressor nation. Ultimately, this meant that neither country's entire nuclear arsenal could

⁴ Marc Milner, *Canada's Navy: The First Hundred Years* (Toronto: University of Toronto Press, 2010), 219.

⁵ Donald Mackenzie, *Inventing Accuracy: A Historical Sociology of Nuclear Missile Guidance* (Cambridge: MIT Press, 1990), 95-164.

be destroyed in one salvo, and that each now possessed a “second-strike” capability. Countering the threat of these new submarines became a top priority for navies around the world.

As the traditional anti-submarine platform of the world’s navies, destroyers lacked the speed and detection range to counter this new threat. Along with the introduction of Variable Depth Sonar (VDS), dual-purpose helicopters were seen by many navies as a way to increase the fleet’s detection, and the Canadian Navy was no different. Capable of both tracking a submarine with their dipping sonar and later attacking it with torpedoes, ASW helicopters provided these precious capital ships with a valued commodity – distance from the enemy. Where Canada differed, however, was in their decision to operate larger helicopters from the decks of small destroyers. Though initially difficult to implement, this concept greatly increased the effectiveness of the escorts’ ASW abilities, and allowed the destroyer to remain the mainstay of the Canadian Navy. According to Shawn Cafferky, these new helicopter-carrying destroyers (DDHs) were much more cost effective than aircraft carriers.⁶ By transitioning to the DDH concept, the Canadian Navy was able to specialize in these anti-submarine operations as a way to not only meet their NATO treaty obligations, but to do so without expending too many resources. Moving forward, the Navy envisioned itself as a small, versatile, and specialized fleet that would work in conjunction with other NATO navies, rather than as a stand-alone powerful fleet. Thus, the acquisition of ASW helicopters fulfilled an important niche in the strategic situation of the Cold War era, augmenting the capability of the destroyers and providing a cheaper alternative to fulfill their obligations to their allies.

While the pressing strategic concerns of the 1950s Cold War provided an impetus for the acquisition of a new ASW helicopter, the search was not an easy process. Finding a suitable dual-purpose helicopter would only be half the battle; they also had to find a way to safely land

⁶ Cafferky, *Uncharted Waters*, 322-323.

and secure the helicopter onto the flight deck of a small destroyer. The Sikorsky S-61 (HSS-2) “*Sea King*” helicopter was examined closely, but, originally weighing in at over 19,100 lbs, its great size was a major issue.⁷ However, there was also a considerable upside to the *Sea King*. It had power-folding rotor blades, could be equipped with a power-folding tail pylon, handled easily on the ground and in the air, had a hull-shaped fuselage that allowed it to land on water in an emergency, and had both the prerequisite weapons and operational capability that the RCN was looking for.⁸ Most importantly, it was a durable and robust airframe, capable of fulfilling multiple roles in almost any weather. Once these positives were laid out, the only roadblock that stood between the RCN and the acquisition of the superior *Sea King* was the question of how to land the large helicopter on the destroyer escorts of the *St. Laurent* class being converted to receive it.

The biggest issues faced by the RCN during this endeavor were the *Sea King*'s size and the inclement weather in which the destroyer-helicopter combination was to operate in the North Atlantic. As the new helicopter was intended to be an all-weather vehicle, the Navy needed to be able to land the helicopter on the small flight deck in almost any conditions with minimal risk to aircrew, ground crew, sailors, helicopter, and the destroyer. When the seas were rough, the pilot had to anticipate a steady period in the ship's movement in order to safely land. Once down, the helicopter had to be secured quickly to avoid dangerous sliding around. Further, the challenge of maneuvering the helicopter from hangar to flight deck in rough conditions needed to be addressed. The RCN tackled these issues by developing the innovative Helicopter Haul down and Rapid Securing Device system, also known as the *Beartrap*. It was a cable and winch assembly that not only pulled the helicopter down to the deck, but also mechanically secured it

⁷ Captain David Hudock, “The Fleet and its Aircraft,” *Naval Forces Special Issue* (2007), 39-43.

⁸ Cafferky, *Uncharted Waters*, 291.

afterwards and moved the helicopter from the deck to the hangar. Thus, this one system solved all three major problems; large helicopters could now effectively be landed on small ships.⁹

Colonel Orr described what it was like to land on the deck of a *St. Laurent* class destroyer, using the *Beartrap* system.

You become blasé about it. It doesn't bother you at all. The first time maybe you get nervous when you see this thing looming up at you. But it is a helicopter, and the people who instructed us didn't think it was anything out of the ordinary so we didn't think it was anything out of the ordinary.¹⁰

Navies around the world, including those of Argentina, Italy, Britain, and the United States, as well as the US Coast Guard, soon sought this innovation. The combination of large helicopter and small warship, capable of operating in any weather, was a truly revolutionary concept. Thus, Cafferky declared that, because destroyer-sized vessels were the backbone of any fleet, "it would be fair to say the Canadian innovation has significantly changed naval warfare."¹¹

Anti-Submarine Tactics of the Cold War Canadian Navy

The principal theatre of the Canadian Navy during both the Second World War and the Cold War, the North Atlantic both inshore and offshore, was notorious for the difficulties it presented to ASW operations.¹² In 1942, for example, Nazi German U-boats penetrated the eastern barrier of Canada, sailing into the St. Lawrence River and attacking convoys for two months with impunity due to the challenging acoustic conditions.¹³ The subsequent Battle of the Atlantic would eventually push the submarines further and further away from North American shores, where they were pursued by Very Long Range (VLR) B-24 Liberators and new forms of

⁹ Ibid., 292-296.

¹⁰ Colonel John Orr, interviewed by author, Victoria BC, March 13, 2012, 2:21-2:57.

¹¹ Cafferky, *Uncharted Waters*, 309.

¹² Cafferky, *Uncharted Waters*, 158.

¹³ Michael L. Hadley, *U-Boats Against Canada: German Submarines in Canadian Waters* (Kingston: McGill-Queen's University Press, 1985), 112.

SONAR and radar.¹⁴ These experiences taught the Canadian Navy valuable lessons in the intricacies of their own offshore areas, and the dangers of a well-trained enemy submarine fleet operating there.

In the interviews with Colonel McManus and Colonel Orr, both officers described the oceanographic conditions off of North America's east coast, and the challenges these presented to ASW operations. According to Col. McManus, who did his post-graduate work in Oceanography, the shallow terrain of the Continental Shelf and the rough, turbulent conditions caused by a high amount of air-sea interaction limited the range that sound could be detected. In addition, Soviet submarines used to operate around the New England Sea Mounts, a long series of jagged underwater mountains that stopped sound from propagating and denied sound waves a clear path to travel.¹⁵ Colonel Orr described how the Labrador Current and the Gulf Stream intermingled off the coast of Newfoundland, which had two important side effects that added to the list of difficulties. Not only did it create different levels of salinity (or salt levels), but it also created temperature gradients, layers of temperature that were nearly impervious to sound, both of which affected the ability to detect a submarine, allowing a clever submarine captain to evade a surface ASW asset.¹⁶ As sound was crucial to detecting and tracking an enemy submarine – either actively “pinging” the target with sonar or passively listening for it – these conditions made ASW operations in this region difficult at best.

However, the most prominent challenge facing *Sea King* pilots and tactical coordinators (TACCOs) did not come from the elements at all. It came from the asymmetry of their mission compared to that of the submarines. In an engagement, the submarine almost always had the

¹⁴ Zimmerman, “Technology and Tactics”, *The Proceedings of the 50th Anniversary Conference of the Battle of the Atlantic*.

¹⁵ Colonel John McManus, interview by author, Victoria BC, March 15, 2012, 59.54-1.04.02.

¹⁶ Colonel John Orr, 17:22-19:00.

tactical advantage – helicopters were hunting an enemy they could not see, who chose the time, place, and nature of the engagement. What developed was more of a battle of information than destruction. Colonel Orr described ASW operations as a “Game of Boxes,” saying:

If you have a box that is a thousand miles by a thousand miles, you will know there is a submarine in there. Using SOSUS, electronic information, and code breaking, you can reduce that to a one hundred by one hundred mile box. Then, you have to drive that down to a ten by ten box, where you can then do a localization. To attack, you need a one by one box. That’s the problem.¹⁷

Having more than one helicopter available to coordinate the hunt made the odds of actually finding a submarine that much better. As a TACCO, Colonel McManus was the officer in the helicopter responsible for the battle of information in these engagements. Working with an Airborne Electronic Sensor Operator (AESOP) in the back of the *Sea King*, McManus coordinated with the operations room on the destroyers, any other ASW helicopters or airplanes in the area, and the pilot of his helicopter to track and engage submarines. He commented that, with two helicopters in the air, they could counteract the single largest deficiency of helicopters in ASW operations – losing track of the submarine when they pulled their sonar out of the water to move to a new position. With a second helicopter present, one would always have its sonar in the water, keeping constant contact with the enemy, while the other repositioned for the next dip.¹⁸ Though adding extra helicopters to the process dramatically improved the odds, the inherent asymmetry of information made consistently tracking and engaging an enemy submarine difficult at the best of times.

Ultimately, these difficulties meant that the *Sea King’s* objective was not necessarily to sink an enemy submarine, but to drive him off and protect the ships of the Canadian Navy.

¹⁷ Colonel John Orr, 20:00-21:01.

¹⁸ Colonel John McManus, 10:45-31.41.

Colonel Orr cited the “Safe and Timely Arrival”¹⁹ concept as their prime mission statement, using tactics to defend surface assets as opposed to attack the enemy. Colonel McManus described some of the tactics that were developed in the highly complex game of cat-and-mouse between *Sea Kings* and submarines during this period. Most times, the helicopters would be sent out to screen ahead of the ships, actively “pinging” the area to clear a path for the ships as they sailed forward. An enemy submarine, who can hear the active sonar and recognize the frequency as belonging to a helicopter, would be left with two choices: aggressively engage the ships through the helicopter screen or attempt to outflank it, making an end run around the helicopter’s detection range. In the majority of encounters, this would force the submarines to lose track of the Canadian surface fleet, or simply fall too far behind to catch up.²⁰

During ASW operations, the *Sea King* often worked with the other major ASW assets of the Canadian Forces, including the maritime reconnaissance and patrol aircraft of the Royal Canadian Air Force, the CP-107 *Argus* and later, the CP-140 *Aurora*. These aircraft had an impressive range, as they were able to fly over 9000 miles without refueling, and had a much larger capacity for weapons and equipment than the *Sea King* helicopter.²¹ To track an enemy submarine, they either used their sonobuoys, which were dropped from chutes near the rear of the aircraft and could be set in either active or passive modes, or they used their Magnetic Anomaly Detector (MAD), located in the tail boom of the aircraft. The increased size of the patrol aircraft also meant a much larger crew complement compared to the helicopters. Four officers in an *Aurora* did the same tactical coordination that was accomplished by a single

¹⁹ Colonel John Orr, 19:00-20:00.

²⁰ Colonel John McManus, 10:45-31:41.

²¹ “Canadian Forces: CP-140,” retrieved on March 25, 2012, <http://www.rcaf-arc.forces.gc.ca/v2/equip/cp140/vt-vv/equip-eng.asp>.

TACCO in a Sea King, something Colonel McManus jokingly referred to as “Navigation by Committee.”²² McManus described how a helicopter would operate with an *Aurora* patrol plane:

I’d be in the dip and I’d be hot, so I would call him in to do a MADVEC, which is when I give him vectors to the submarine and he flies in low to use the MAD that was located in the tail boom of the aircraft. In theory, if I have directed him correctly, when he flashes his MAD, he will detect the magnetic anomaly of the submarine and be able to drop a torpedo.²³

Colonel Orr told an anecdote about a potential downside of working in conjunction with a patrol aircraft:

The radar operators on one of the aircraft would see a helicopter drift into their radar screen, and it looked to them, at least initially, like a periscope. So they go whistling in, low over top of you, and they would get a MAD confirmation that there was something there. They now have a radar contact, confirmed with MAD, and they will start throwing things out the back end. This is not exactly comforting for the guys in the helicopter, who are sitting at forty feet watching this smoke float drifting down in front of them, just missing their rotor blades.²⁴

Despite the potential for confusion, both officers agreed that the *Sea Kings* worked well with the patrol aircraft, as the increased weapons capacity, the larger crew complement, and the strength in numbers provided by additional aircraft helped to balance the odds in engaging an enemy submarine.

Sea Kings in the Persian Gulf Conflict

As the first major international intervention incident after the end of the Cold War, the war against Iraq was a harsh wake-up call for the Canadian Navy. The specialized anti-submarine role of the Cold War Navy suddenly became outdated. According to Commander (ret’d) Peter Haydon, operations in the post-Cold War would require flexibility, as the emphasis

²² Colonel John McManus, 2012, 47:43-54:30.

²³ Colonel John McManus, 52:01-54:30.

²⁴ Colonel John Orr, 55:30-56:53.

would now be on quick deployments to international intervention war zones.²⁵ When the UN decided to impose sanctions on Saddam Hussein's Iraqi government, three Canadian warships would be deployed in this way, including two with helicopter carrying capacity – the replenishment ship *Protecteur* with its complement of three *Sea Kings* and HMCS *Athabaskan* with its complement of two. Both the ships and the helicopters would be forced to adapt quickly to the new operational requirements of working in a hot, dusty environment against a different kind of enemy than they were accustomed.

It was assessed that the traditional ASW role for which the helicopters were designed was not as critical, since the Iraqi Navy did not have submarines. The helicopters were quickly refitted with a new mission suite to perform a maritime interdiction role instead. They were outfitted with a Forward Looking Infra-Red (FLIR), a Global Positioning Satellite (GPS) system, stabilized day/night binoculars and Night Vision Goggles for surveillance, chaff and flare launchers for defence, and multiple defensive warning systems more suitable for surface operations.²⁶ Lastly, a General Purpose Door-mounted Machine Gun (GPDMG) was installed for defence and blockade enforcement. The team responsible for outfitting the “Gulf-mod” helicopters was comprised of three sections: NDHQ staff, who were responsible for selecting and approving the installation of equipment; all eighteen members of the Helicopter Operational Testing and Evaluation Facility (HOTEF), who were responsible for testing and evaluating it for operational purposes; and aerospace engineers from the Aerospace Engineering Test Establishment (AETE) organization from Cold Lake, who ensured that the new aircraft were safe to fly. According to Colonel McManus, the three groups were thrown together in a room and tasked with making the helicopters safe and operational in the three weeks before the Canadian

²⁵ Peter Haydon, “What Naval Capabilities Does Canada Need?” *Canadian Military Journal* 2(1) (2001), 24.

²⁶ Charlton and Whitby, *Certified Serviceable*, 412-3.

Task Force sailed for the Persian Gulf.²⁷ Once combined, elements of the three sections were further divided into subgroups, which were given the responsibility of installing and testing individual pieces of equipment into the helicopters. The time constraints of the project meant that different modifications had to be installed simultaneously on different aircraft, tested separately, and then combined together at the end.²⁸

McManus, then a Captain, headed the team responsible for testing and evaluating the GPS system and the FLIR in the modified aircraft. The GPS was a crucial addition because the exact location of the helicopter during operations in the Persian Gulf would be important; there were constant border disputes between the nations surrounding it, and without precise instrumentation, the helicopters would be in danger of violating a neutral country's territorial waters. The Forward Looking Infra-Red (FLIR), on the other hand, would give the crew of the aircraft better operational capacity for flying at night, as the equipment could pick out objects that were different temperatures than their surroundings, be they men floating at sea or the engines of a far-off aircraft or ship. McManus discussed the FLIR's capabilities, telling the story of their test flight as they flew past the Texaco Refinery on their way back to the base at Shearwater:

Texaco was having financial problems at the time and the government of Nova Scotia had just poured a bunch of money into that refinery. Texaco maintained that they were fully operational, but when we flew by, all of the pipes were cold and there was no oil in the tanks. With the FLIR, we could see inside the tanks as if they were a clear water bottle, and we realized then that the FLIR would be of intelligence value.

He told another anecdote from his time as the Commanding Officer of HS 443 in Pat Bay, British Columbia in order to further reinforce the intelligence capabilities of the FLIR:

²⁷ Colonel John McManus, interview by author, Victoria BC, March 15, 2012, 3:50-4:11.

²⁸ Charlton and Whitby, *Certified Serviceable*,

North Saanich/Sydney RCMP were doing a bust on a grow-op, and they called me up when I was the CO of 443 and said, “I understand that your FLIR could look at a house and tell us whether it was hot or not.” I said, “Yup, we can do that. If I were to look at a grow-op house, I would know right away.” He asked me to send a helicopter down to check out this house, and I had to tell him no, because the Canadian military cannot be used to spy on Canadians. But the intelligence value of the equipment was clear – we had a huge increase in our ability to know what’s going on out there, both day and night.²⁹

The inclusion of FLIR in the Gulf-mod helicopters had another consequence; as the only naval helicopter in the NATO Task Force that had one, the Canadian *Sea Kings* were tasked with flying at night far more often than their American or British counterparts, for better or worse for the men who operated them.

When the team responsible for evaluating the door-mounted machine gun conducted their test flight, McManus was asked to come along. During the flight, they set up Javex-bottle buoys at a series of pre-determined ranges in the water to test the aiming and firing of the weapon from the back door. From the test, McManus and his fellow evaluators found that while the C6 was accurate, especially when using tracer rounds, the small caliber bullets would not even penetrate the Javex bottles at range. In the end, however, it looked impressive firing from the aircraft, which would prove to be important for imposing the blockade of Iraq.³⁰ McManus told the story about the first shots fired in anger by a *Sea King* helicopter:

A *Sea King* was enforcing a certain no-go area for these dhows. They had orders to not let these dhows go. The helicopter and the ship both called them on the radio, but the dhows ignored them. The first shots that were fired in anger were fired by a female AESOP, who was given orders to put a line of tracers across their bow. As soon as she did that, they all turned around. It was interesting because Canada had just deployed the CF-18s and the pilots were all scratching their chest saying, “Don’t worry. The war fighters are here.” And the first shots were fired by a female AESOP from the back of a *Sea King*.³¹

²⁹ Colonel John McManus, 9:12-10:45.

³⁰ Colonel John McManus, 18:11-21:45.

³¹ Colonel John McManus, 21:45-22:40.

Apparently, these tracer rounds looked intimidating enough to halt the dhows. Unfortunately, if the helicopters had ever been called upon to actually fire upon an enemy, McManus joked that “if a guy had a heavy raincoat on, the bullets probably would have bounced off.”³²

In addition to the new tactical equipment and the machine gun, the switch from the cold maritime environments of the North Atlantic to the dusty, hot desert environments of the Persian Gulf required further refit, including cooling vests for the airmen, cooling systems in the engine and electronic systems, and desert survival kits.³³ The helicopters, which always required high maintenance, would be put under constant scrutiny throughout the campaign, as the ground crews struggled to keep them in the air. Lieutenant Colonel Ed Mitchell described some of the difficulties in maintaining the helicopters as they made this transition:

The big thing is sand on your perspex and on your windscreen. If you left your aircraft out when the wind is blowing, it's like sandblasting and you get all these striations and marks. This largely affected the IR (infra-red) and the optics on the nose, as they flew through the sand. As well, the heat affects the efficiency of the engines. You can't produce as much horsepower, and the lift is not there.³⁴

To overcome these issues, maintenance and inspection had to be ramped up, with the equipment being covered for protection and cleaned on a regular basis. While this would help to safeguard the equipment, LCol Mitchell also pointed out that there was little that could be done to make up the lost horsepower of the engines. They would merely have to be maintained on an increased inspection cycle, with some fine-tuning and a careful operational tempo. The hard work of the maintenance personnel paid off, however, as the five helicopters of the Canadian *Sea King* fleet completed 1,012 out of 1,031 tasked missions – an availability rate of over 98 percent.³⁵

³² Colonel John McManus, 23:00-23:10.

³³ Charlton and Whitby, *Certified Serviceable*, 413.

³⁴ Lieutenant Colonel Ed Mitchell, interview by author, Victoria BC, March 17, 2012, 48:28-51:43.

³⁵ Charlton and Whitby, *Certified Serviceable*, 427.

Without their dipping sonar and the rest of their typical ASW load out, the Canadians adapted quickly to their new anti-surface surveillance role. They developed the Vertical Insertion Search and Inspection Team (VISIT), a boarding party that used *Sea Kings* to descend onto merchant ships, which gave the Task Force greater operational freedom as they imposed the blockade.³⁶ As the campaign progressed, they also began to take on additional mission types, including mine surveillance, interception of minelayers, and warning off all non-military aircraft, helicopters, and ships from the deployment area. They also increasingly took on ship-to-ship and ship-to-shore logistic runs, transporting material, parts, mail, and personnel in a constant shuffle around the Gulf. One completely unforeseen, yet decidedly important, role taken on by the helicopters occurred after Hussein ordered Kuwaiti oil to be pumped into the Persian Gulf. The *Sea Kings* were sent out to guide the Canadian warships through the resultant oil slicks, scouting a path for the naval vessels so the oil would not contaminate their machinery.³⁷ Moving forward, the *Sea King* helicopters of the Canadian Navy would no longer be limited to the singular field of ASW operations, but would fulfill a multi-faceted, ubiquitous role in force projection and international intervention operations.

Sea King Operations in the Post-Cold War Era

The experiences of and the lessons learned from the Persian Gulf War were indicative of the new roles that were to be taken on by the Canadian Navy and the DDH-helicopter combination that formed its backbone. Though the helicopters would still include ASW in its expanded mission suite, the emphasis was now on a quick deployment, anti-surface role. The rest of the fleet was completely modernized over the decade following the Persian Gulf, with twenty-

³⁶ Plamondon, *Politics and Procurement*, 99.

³⁷ Charlton and Whitby, *Certified Serviceable*, 425.

eight new ships including those of the Canadian Patrol Frigate (CPF) project. Only the DDH 280s, the AOR ships *Protecteur* and *Preserver*, and the *Sea King* helicopter remained from the Cold War era.³⁸ Many of the operations that occurred following the end of the Cold War reflected the new mission requirements that became evident in the Persian Gulf. The ASW duties of the aircraft were still prevalent, but they were no longer the central tenet of the *Sea Kings* as they had been previously. When elements of the Canadian Navy deployed to sea, the helicopters needed to be capable of surface ship surveillance and targeting, search and rescue (SAR), medical evacuation, and vertical replenishment.

The diversity of these new deployments can be seen in the operations that occurred during the command tours of both Colonel McManus and Colonel Orr. During his tour at the Maritime Air Group (MAG) and as the Commander of the Maritime Air Component (Atlantic), Colonel Orr recalled two specific operations conducted by *Sea King* helicopters, both of which were predominately search and rescue. He described the efforts of *Sea King* and *Aurora* personnel during the Red River Flood in Winnipeg, 1997. Both aircraft flew patrol missions, searching for breaks in the hastily constructed dams along the flood area. As well, “the only air rescue that was done was conducted by a *Sea King* helicopter. We had pictures of a *Sea King* flying over the Red Sea again, but this time was in the middle of the country.”³⁹

The other major SAR operation that occurred during this time was the crash of Swiss Air Flight 111, which went down on 2 September 1998 near Peggy’s Cove, Nova Scotia. Colonel Orr described the incident as a challenge because CFB *Shearwater* became the reception facility for what little remained of the plane after the crash.⁴⁰ An air control and organizational issue quickly developed, as there were four institutions operating helicopters and vehicles around the

³⁸ Milner, *Canada’s Navy*, 308.

³⁹ Colonel John Orr, 1:12:14-1:13:05.

⁴⁰ Colonel John Orr, 1:13:05-1:17:00.

crash site, including the Department of National Defence, Federal Ministry of Transport, the Provincial Department of Natural Resources, and the Coast Guard. Each assisted in ferrying pieces of wreckage back and forth from the crash site, as well as the delicate operation of handling human remains and body parts. A morgue had to be set up at *Shearwater* and the remains carefully organized, as only 1 of the 229 passengers and crewmembers was visually identifiable, and the victims were from 12 different countries.⁴¹ Ultimately, Colonel Orr commented that all of the base personnel at Shearwater handled the situation admirably, and the *Sea King* crewmembers worked diligently through this delicate operation.

During his time as CO of 443, Colonel McManus deployed four Helicopter Air Detachments (HELAIRDETs) to the Arabian Gulf in support of Operation Apollo. The mission was designed to provide a NATO presence in the area as the Global War on Terrorism began to ramp up after 9/11. The Canadian Navy sent modernized Gulf-modified helicopters attached to *Halifax* class frigates in order to conduct operations similar to those of the Gulf War, monitoring surface ship activity, searching for mines, SAR, and other marine interdiction roles. Importantly, McManus made it clear that the Canadian presence was not there to support the American invasion of Iraq, Operation Enduring Freedom, but instead to support the naval forces that were supplying the mission in Afghanistan. In addition to Operation Apollo, Colonel McManus also discussed the Canadian Navy's continued role in Somalia, as they consistently deployed a frigate with a HELAIRDET there, using their new anti-surface capabilities in an anti-piracy role.⁴²

Admittedly, these four operations represent a small proportion of *Sea King* operations since the Gulf War. The helicopters have flown with task forces to faraway places like East Timor in Indonesia and Libya in the Middle East. Unfortunately, the secondary literature has not

⁴¹ Nancy Robb, "229 People, 15,000 Body Parts: Pathologists help solve Swissair 111's Grisly Puzzles," *Canadian Medical Association Journal* 160(2), 241-243.

⁴² Colonel John McManus, 40.25-44.38.

really covered the variety of operations conducted by the Canadian Navy, and consequently, we must rely on the firsthand accounts of the men in command at this time. To this end, these were the most prominent operations that occurred during the command tours of Colonel McManus and Colonel Orr, and, consisting of two SAR and two force projection missions, these operations were indicative of the new role taken on by the Canadian Navy in the new global environment, far outside their traditional mission of ASW.

Reflections from the *Sea King* Community

The single most important question asked of the subjects of these interviews was, “what is it about the *Sea King* made it so versatile and long lasting?” Though a simple and direct question, it was one that has not really been answered in the secondary literature. Shawn Cafferky focused on what made the helicopter a good fit for the Canadian Navy in the 1950s and 1960s, having little to say about the long-term versatility of the aircraft. Aaron Plamondon was often too busy crucifying the Canadian government’s procurement practices to examine the helicopter itself; his preoccupation was with the fact that they were still in the air rather than how they were still in the air. Even the authors of *Certified Serviceable* (1995), who were examining the technical history of the aircraft, did not really answer the question, as they focused on the modifications themselves and their subsequent tactical use, rather than those characteristics that gave the helicopter longevity.

Ultimately, it was a question that the subjects of these interviews were in an excellent position to answer, given their long term experience with the *Sea King* and that their lives were often banking on the quality and versatility of their aircraft. As an officer in charge of maintaining the aging *Sea Kings*, LCol Mitchell had this to say:

They can carry a sizable payload, not huge, but sizable. Because of the folding blades. Because of the functionality of being able to land on a deck at sea. Helicopters by their nature are versatile, but the medium sized transport helicopters – of which the *Sea King* is one – can be just about anything to anyone, as shown by the civilian side of things. They are very reliable aircraft.⁴³

Through his experiences as a TACCO in the 1980s, his time testing and evaluating new equipment for the aircraft at HOTEF, and his command tour at HS 443, Colonel McManus gained a healthy respect for the *Sea King's* versatility. This was his response to the above question:

The initial sophistication of the aircraft and of all of the analog computer components – the technology and the brains that went into it was just amazing. Many of the things that we had asked for from AgustaWestland, who were going to build us the EH-101, were things that were already in our 1950s-developed *Sea King* and we were told that they were going to be difficult to include. The *Sea King* was very well designed, the transmission was very good, as were the way the drive train and tail rotor worked. The mission systems were the things we have had problems with over the years, but the actual airframe, engines, transmissions, and tail rotor were extremely reliable.⁴⁴

Finally, Colonel Orr's experiences as a Cold War ASW pilot, in addition to his time commanding HS 423 on the East Coast, helped shape his opinion of the *Sea King*:

It was a robust, flexible platform with lots of real estate inside. It's not computer based, which means if you want to change things around, you can do it fairly easily. Of course, the evidence of that was when they went to the Gulf War. I think it's a safer aircraft than it ever was. It's not easy maintaining an aircraft of that vintage. However, if you are willing to spend the money, either in parts or in maintenance man-hours, the thing will fly forever.⁴⁵

The unifying trend between these three accounts was obviously the reliability of the aircraft, and when combined, a composite view of what made the helicopter so versatile and durable can be created, from the perspective of those that observed it firsthand. Ultimately, the *Sea King* helicopter was a robust, flexible medium-sized helicopter, which by their very nature were versatile, that was exceedingly well designed and had an excess of readily convertible real estate

⁴³ Lieutenant Colonel Ed Mitchell, 18:30-19:50.

⁴⁴ Colonel John McManus, 50:48-52:50.

⁴⁵ Colonel John Orr, 1:24:20-1:26:00.

inside. The original components were sophisticated and, but because they weren't integrated, they could easily be reconfigured when it came time to update its mission suite.

Oral History as a Source

The oral history interviews used in this paper were not meant to supplant other historical sources, but to supplement them. The gaps that existed in the secondary literature may have been filled in by a careful examination of the archives or other documentary sources. One could research anti-submarine tactics, for example, by consulting training manuals, or early theorists that were examining the issue. But by limiting their research to the documentary sources, they would have missed out on a wealth of knowledge and experience. The officers interviewed here did not discuss their experiences with anti-submarine tactics because they read about them in a book; they were able to discuss them because they experienced them firsthand. Through the interviewing process, one could discover what it was like to actually land a large helicopter on the back of a small ship, how anti-submarine tactics actually worked once the helicopter was in the air, or some of the issues that occurred in maintaining an aircraft as old as the *Sea Kings*, from the men in charge of flying, directing, and maintaining them. In a story as large and as complex as the history of the *Sea King*, every source, be it documentary or oral, should be consulted in order to truly do it justice.

All historical sources have their own inherent biases and inaccuracies. While oral history can be used to clarify these shortcomings in documentary sources, their own strengths and weaknesses must be examined closely as well. For example, the interview conducted with Colonel John Orr had its own unique bias. Upon his retirement from the Canadian Forces in 2000, Colonel Orr has taken up a post as a Research Fellow with the Centre for Foreign Policy

Studies at Dalhousie University, and this presented its own issue in interviewing him. How much of his information that he offered was derived from his historical knowledge, and how much was derived from firsthand experience? For some issues, like the larger political angle, separating the two could be difficult. Fortunately, this was largely overcome by the direction of this paper, as the technical and tactical operation of the *Sea King* was something that he had direct experience with. What it was like to land on the deck of a small ship, the difference of operating from a *St. Laurent* class destroyer compared to a *Tribal* class, how well the helicopters operated with other NATO navies, the experience of having a large patrol aircraft fly by and hunt the *Sea King* as if it were a submarine, and so on, were all sections of the narrative that focused on his direct experience with the helicopter, rather than knowledge he gained from studying the aircraft later.

The distance that the subject has from the anecdote that he is telling can also present its own challenge. During the Persian Gulf conflict, for example, Colonel McManus remained behind at CFB *Shearwater* to continue testing the modifications that had been made to the Gulf helicopters. He was not actually present in the Gulf when the female AESOP fired those first shots in anger, and thus it was not part of his direct experiences. However, the very nature of the anecdote makes it valuable. The story of the female AESOP who beat the fighter pilots to the punch would have travelled easily through the ranks, making it an example of collective remembrance by the military, rather than just one officer's experience.

In terms of the interviews themselves, this paper's move away from the larger political picture hurt the effectiveness of the third interview, that of Lieutenant Colonel Ed Mitchell. As his maintenance duties had him work on more aircraft than just the *Sea King*, his direct experiences with the helicopter were somewhat limited to the 1980s, when he was in charge of first-line maintenance of the *Sea King* at CFB *Shearwater*, and the mid-1990s, when he

commanded 12 AMS. Had the political picture constituted a major portion of this paper, which it quite easily could have, Mitchell would have been much more prominent in this paper, as he was able to provide in depth answers regarding the maintenance of the aircraft as it got older, the effect that the coming New Shipborne Aircraft (NSA) project had on the maintenance project, and the ways in which the maintenance organization recovered from the cancelling of the NSA. As it stands, Mitchell provided an excellent account of base organization and the maintenance practices of the Canadian Navy, but, by focusing on tactics and equipment, these sections of the *Sea King's* history were not included.

On the other hand, the experiences of Colonel John McManus lent themselves easily to the direction of this paper. The chronology of events detailed above closely matched the chronology of his career, with half falling before the conflict and half falling afterwards. In particular, his role in HOTEF, writing operational and tactical instructions for new equipment being installed on the helicopters, was particularly relevant to a discussion of tactics and equipment. Combined with *Certified Serviceable*, the interview with Colonel McManus was a deep resource for the *Sea King's* transition through the Persian Gulf.

The strengths and weaknesses of these three interviews hold true for oral history in general. Much of history is anecdotal, a long and continuous series of experiences by men such as Colonel Orr, Colonel McManus, and Lieutenant Colonel Mitchell. These anecdotes are rarely done justice by documentary evidence, and the historian who relies entirely on one form of evidence over the other will only be presenting half of the picture. The unique nature of military history, with its general emphasis on "big man history" and the larger picture of wars, amplifies this issue; in order to properly document an encounter, all sides of it should be presented, from the top of the military hierarchy to the bottom. In the case of the *Sea King*, oral history helps to

fill in the less well known and largely lower-ranking realm of ASW tactics that would be missed in a broader, big picture narrative. It is also important to note, however, that the interviews conducted for this paper were limited to officers only; there were no interviews with enlisted or non-commissioned personnel such as AESOPs or maintenance crew. Even using oral history, the whole picture of the *Sea King's* history is still not being presented.

Interestingly, all three of the secondary sources assessed in this paper used oral history to a greater or lesser degree. Shawn Cafferky combined archival evidence and papers from DND with the personal experiences of the men of the experimental squadron, VX-10, who helped test the *Beartrap* system.⁴⁶ Aaron Plamondon relied a little more heavily on secondary sources and documentary evidence, including *Certified Serviceable*, but he also used oral history interviews in his research, including several with Colonel John Orr. Peter Charlton and Michael Whitby focused almost entirely on oral history sources, as they sought to provide a firsthand account of the technical transition of the *Sea King* helicopter through its introduction and the Persian Gulf Conflict. They interviewed officers from HOTEF, members of the maintenance teams, as well as aircrew. Thus, many of the facts, details, and quotes that were pulled from the secondary literature for this paper have been originally created using oral history. It seems that a topic as broad and as complex as the *Sea King* lends itself easily to oral history to supplement the written record.

Conclusion

The history of the *Sea King* was a narrative of adaptability. Brought into service in the 1960s to fulfill an anti-submarine role for the Canadian Navy, the helicopter was instrumental in Canada's development of the revolutionary DDH concept. The helicopters then flew with the fleet for the last thirty years of the Cold War, working with patrol aircraft to screen for the

⁴⁶ Peter Charlton, *Nobody Told Us It Couldn't Be Done: The Story of VX-10* (Ottawa: Published Privately, 1993)

destroyers and extending the ASW range of the fleet in general. By the Persian Gulf Conflict, however, this mission suite was largely outdated and six helicopters were converted to perform a multi-faceted role in anti-surface, search and rescue, medical evacuation, and logistical supply. In the changing landscape of the post-Cold War world, the destroyers and frigates of the Canadian Navy – and by extension, the helicopters flown from them – have thus become central to Canada’s ability to project their global reach. That they are now doing so using a fifty-year-old piece of technology is a testament to the adaptability and ingenuity of the Canadian Armed Forces. Given the complexity of its narrative, any future work on the *Sea King* helicopter will have to largely rely on oral history as a source, as without it, the publication will only be presenting half of what is an exceedingly interesting story.

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