



ORAL HISTORY INTERVIEW TRANSCRIPT

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INTERVIEWEE: Ken Hansen

INTERVIEWER: Roger Chiasson

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Ken Hansen
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Interviewed By Roger Chiasson

Interview starts

INTERVIEWER: This is a CANDIB Oral History Project interview with Cdr (Ret'd) Ken Hansen that was recorded in Halifax on Wednesday the 16th of March 2011. Mr. Hansen was interviewed by Roger Chiasson. Both participants have signed the copyright release form. The subject of this interview is naval operational logistics. The subject which has not received much attention to date among naval historians, it is however a subject in which Mr. Hansen has taken a keen interest for a number of years and a subject which formed the basis of his master's thesis. He continues his research as a resident research fellow at the Dalhousie University centre for foreign policy studies in Halifax.

Naval operational logistics is a vast subject which cannot be fully addressed in a single oral interview. The purpose of this interview therefore is to serve as an introduction to the subject and to hopefully serve as an impetus for future research and dialogue in an area critical to the success of any modern navy. The interview will focus on four areas namely; one, the definition of naval operational logistics; two, a brief historical perspective; three, factors which affect naval operational logistics; and four, the lessons learned from history. Before we launch in to the substance of the interview I would ask Mr. Hansen to introduce himself and to provide us with some insight as to how he became interested in the subject of naval operational logistics.

HANSEN: Very good, thank you Roger for this opportunity to pass on some of the things I've learned and it got started when I was working on the staff at the Canadian Forces College in Toronto with the maritime studies program there and we did a critical assessment of the curriculum of the program along with the needs assessment of the students and their employers and we came up with a very clear void in the curriculum that dealt with the issues of logistics and that was everything from the national level down through operational logistics to tactical issues as well so we set to work on that, revised the curriculum, introduced a number of new items including a major exercise and in the course of all of this I was starting my master's thesis and my superior at the time Commander Paul Leblanc who said yes you may do the master's thesis work but only if you coordinate it with what we're trying to accomplish here with the program curriculum so I was a bit downcast at the prospect but agreed to do it and it has resulted in many, many unexpected gains and developments on my part.

INTERVIEWER: Very good well thank you. That was very brief but very enlightening. It's amazing how career paths start or diverge. So the first task at hand is to define naval operational logistics and to tell us what the aim of, or purpose of, naval operational logistics are.

HANSEN: Alright.

INTERVIEWER: If you could address that.

HANSEN: Right. Every operating unit of a naval force has designed into it characteristics that dictate its tactical endurance so it will have a certain capacity for fuel. It will burn that fuel at certain speeds and these dictated tactical characteristics, so beyond that in an operational context a single ship, not normally but more likely a group of ships will at some point reach or approach precariously their limits of tactical endurance whether it's from the usage of critical stores or simply for burning fuel so operational logistical capacity extends that tactical endurance and allows them to undertake missions and tasks that they cannot accomplish within the normal operating radius of their home base and that's the principle issue and that was the critical issue with the curriculum in Toronto because it was an operational level education that we were trying to give these people, who had tactical proficiency. How would we impart upon them the importance of operational logistics not only in a single service national capacity, but in a joint and combined capacity when they're deployed on operations, who knows where in the world.

INTERVIEWER: That's interesting because I think what you're saying is if we were a coastal navy only, naval operational logistics probably wouldn't be a big deal, but because we at least consider ourselves to be a blue [water] Navy and we have operated far from our shores quite repeatedly in history that's where naval operational logistics really comes in; is that correct?

HANSEN: That's all very true. Coastal navies generally are that in character because of strategic factors that dictate the interests of the country or the means of the country. So to build a large blue water Navy that can go about the world doing any number of missions and tasks is an expensive undertaking and the country may simply may not have the means. So the Canadian case is an interesting one though because in 1910 when we were first created the Navy was designed to be a coastal force. It was a local defensive organization only and if you looked at the units, most of the units had what I characterized earlier as very low tactical endurance with a couple of exceptions.

So there were one or two ships, cruisers normally bigger cruisers that were used in that age for varied long range operations that did have higher tactical endurance, but they fell out of favour very rapidly because the leadership of the Navy was not interested in constabulary or domestic patrol types of operations. They wanted to be engaged with the Royal Navy and the battle fleet scenario that they saw shaping up in the First World War in which again eventually developed in the Second World War. Interestingly though when the wars do come about immediately the low endurance capabilities, the low tactical endurance capabilities of the vast majority of the small fleet we did have, rapidly produced poor tactical performance and we had to start right away trying to find ways to improve that and because there are physical limitations within ship design that you can't easily change. Operational logistics eventually became the way, but it was the story of how we learn that lesson is painful; it's a really painful thing to read and to analyse.

INTERVIEWER: Well I think that's a fairly good segue into the first major topic which is the historical perspective and we're going to work off a bit of an outline that you and I both agreed

on. The first point is the origins of naval operational logistics and I think you sort of gave us a hint of that so if you could go a little bit deeper into that I'd appreciate it.

HANSEN: Yes absolutely and this has been the subject of my recently published article in Canadian Naval Review. As the war, the Second World War now, as the Second World War expands into the Atlantic, German U Boat operations are moving progressively further westward in a means, in an effort on their part to escape the convoy operations that the Royal Navy had put in place. The Germans were expanding their submarine operations and surface radar operations progressively westward to get beyond the zone of coverage that the Royal Navy had established as a defensive mechanism to prevent attacks on merchant convoys. Eventually the Germans expanded their zone of operations across the entirety of the North Atlantic and this forced, as an adjustment on the part of the allies, a new escort situation that they had to have groups going across the ocean but it could only be done to relays. Yes endurance of allied escorts was so low, allied escorts not including American ships, was so low that it could only be accomplished in small steps by handover points and this system was very complicated and prone to failure.

The other thing they were learning was that upon contact with enemy forces the standard tactical responses of the day very often required for the use of high speed. This of course exhausted their limited fuel supplies all the faster so something had to be done in order to address this problem and the answer came from the efforts of a combined American, British and Canadian escort group, the A3 escort group that was working under American command out of Argentia, Newfoundland and the captain in charge of the escort group was an American, although he sailed in a U.S. coast guard cutter which had exceptionally high endurance, and his name was Captain Paul Hineman and it seems that from June 1942, which predates the first transatlantic operations of escort group A3, that the Americans had been experimenting with transferring fuel from the onboard reserves of commercial oil tankers.

So these were not U.S. Navy fleet oilers, but simply commercial tankers of the type that plied the oceans all over the world approximately ten knot ships of ten thousand dead weight tons capacity and the system they devised was based on the American system of alongside replenishment and it used very simple means, just the standard two and a half inch canvas deck wash hoses that they call them deck wash hoses at the time. They also doubled as fire hoses and they could travel or sorry rather they could transfer in the order of about fifty tons of fuel oil in about an hour and this method of fuel transfer was practiced from approximately August through to December of that same year by the A3 group alone and that information is not widely known.

INTERVIEWER: Now you've covered the introduction by the Americans of this alongside refuelling from commercial tankers but can you go back a little further and talk about the astern method of fuelling and how this - just refuelling at said period - was either accepted or not accepted or handled by both, by all staffs.

HANSEN: Right. The Royal Canadian Navy was designed as a small adjunct to the larger Royal Navy and so in terms of its culture, its history, its traditions it was very, very British in all facets of its operation and this of course extends naturally to their attitudes towards operational logistics. The British Navy had experimented with operational logistics and they had developed

their own standard practices. Interestingly theirs diverge quite significantly from the Royal Navy or the United States Navy differs from the Royal Navy and the Royal Navy had devised an astern method of replenishment which they called the stirrup method and it employed a series of hoses that were made of an extraordinary woven bronze metallic material that was chosen mostly because they viewed the transfer of fuel oil to be a fire hazard. They were afraid of electric spark or shock or some other such thing causing a fire. These hoses proved to be very brittle in fact and prone to ruptures and the system was very complicated because it involved this astern stirrup thing. So there was a tow line and then there was another line that was right beside it which was meant to be taught because of the towing effect and then this hose was suspended on these little stirrup affairs that ran backward on the supporting cable to the receiving ship.

The Royal Navy believed because of their experience that replenishment at sea by the astern method, and they didn't even contemplate an alongside method, was something that could only be done in ideal weather conditions. So it had to be practically flat calm and the seamanship involved in it was very advanced so the professionals in the Navy practiced it, but not frequently, because they didn't see it as being a broad application. In the case of reservists who were manning minor warships and were sometimes only called to service in times of national calamity they simply didn't have the exposure to replenishment by the astern method. Just as an aside there was a little bit of alongside fuelling done mostly from battleships to screening destroyers and they did it by booming out a hose to a destroyer that sat on their quarter at very close range and transferred very small amounts of fuel to the destroyers. It was only meant to extend their endurance by a matter of hours or a day or less, but...

INTERVIEWER: And this was done underway?

HANSEN: This was all done underway but it was always viewed as a very secondary and very emergency procedure. They practiced it, but it wasn't given a lot of time or energy in their processes.

INTERVIEWER: Okay so where did, at what point did Canada start getting it I guess is the next question? Obviously we know where we ended up, but how was that transition made from perhaps defying the RN model and copying the Americans?

HANSEN: Canada only starts to get it after Captain Hineman goes to brief Admiral Sir Max Horton on the accomplishments of the A3 group at sea by refueling from commercial tankers and Admiral Horton is immediately convinced of the importance of this new methodology and the simplicity of it. He gives direct orders to his staff that the methods are to be implemented in all western approaches, escort groups and he sends reports up to the Admiralty about the importance of at sea replenishment from commercial tankers.

The problem still persists though in that Admiralty who has not been given first hand exposure to this new technology still prefers their astern replenishment techniques and their tried and what they believe to be true, equipments; these bronze metallic hoses. So throughout the war as escort oilers come in to service which are commercial tankers which have been modified by US shipyards, all the work is done in the US, that they still liked to see their ships being fitted for

stern refueling which they still view for quite a bit of the time as the primary methodology but grudgingly they start to accept the fact that the alongside method is acceptable.

A fly in the ointment in this whole discussion is the capturing of replenishment hoses from the German supply ship to *BISMARCK*, *LOTHRINGEN*. The Germans have a very innovative hose system which is made out of rubber hoses and threaded aluminum end caps that the Germans used to inflate with air and then simply float down to a vessel astern which in this case was Bismarck or the heavy cruiser *PRINCE EUGEN*. They used this method for underway replenishment, very successfully, and when *LOTHRINGEN* is captured the Royal Navy intelligence people immediately recognize the utility of these hoses and despite the fact that aluminum and rubber is in very critically short supply during the war the Admiralty immediately orders the highest priority be assigned to the production of these hoses for the purpose of fitting to escort oilers; so it re enforces the division between the alongside method which the A3 group is practicing and the astern methods which the bulk of the Royal Navy is using. They view the inflatable rubber hose as being the solution to the problem and the Canadian Naval staff in Ottawa follows along with that idea and they're very dismissive of reports that are coming from RCNVR captains in the A3 group saying this alongside method works. The shortages in rubber and aluminum supply mean that these hoses come out only very slowly and of course as time is progressing, now late '42 in to '43, the Battle of the Atlantic is coming to its critical head. Right up until March of '43 it looks like it's going to be an outright defeat and one of the principle factors that is causing low Canadian escort group performance is their poor tactical endurance and their inability to get the fuel that lays just there in tankers in the convoy for lack of the correct hoses. The A3 group is saying canvas hoses are readily available, you can get them now, this alongside methodology works and the only problem is it's a bit of a seamanship challenge, but the more you practice it the quicker you'll get on to it.

INTERVIEWER: So just to be clear the Canadian Navy did not use the alongside method even when it was employed with the A3 task force; is that correct?

HANSEN: The Canadians in the A3 task group definitely used the alongside method and it was only rarely used elsewhere but it was rarely used. The Royal Canadian Navy persists along with its parent Navy, the RN in favouring the astern method right up until the end of the war.

INTERVIEWER: Very good. Well that comes as very interesting. So unless you think we've missed anything can we jump to the post World War II period? Can you tell us about how that transpired after the end of the war?

HANSEN: The end of the war sees a retrenchment by the Canadian Navy. We have by this point acquired British aircraft carriers and cruisers, fleet destroyers all from British sources although some of it is built in Canada and with that comes a retrenchment on Royal Navy practices which includes replenishment at sea. The carrier is able to replenish escorts, destroyers in this case and sometimes frigates by using her aircraft boom and booming out a hose to the receiving ships which in a manner of speaking is an alongside methodology, but again it's not viewed as standard practice.

INTERVIEWER: Can I just ask if that method from the aircraft carrier was from the side of the aircraft carrier to the stern of a Canadian ship or to midships?

HANSEN: It would be in the beginning it was from the side of the aircraft carrier to the bow of the destroyer....,

INTERVIEWER: Bow okay, of course yes.

HANSEN: ...and later there are photographs of the receiving ship taking the line further aft so to the part we would call the top part ship where the boat deck traditionally was. That was as they learned about the interaction of the pressure forces between the larger, in this case very much larger supplying ship to the receiving ship it was better to move up alongside the ship and minimize these pressure forces between the bow and stern of both ships.

INTERVIEWER: So where do we go from there? We're, we're now in to the fifties I suppose and how did the modern method of replenishment evolve?

HANSEN: Right, the impetus for this is the Cold War role of the Canadian Navy in antisubmarine warfare. Studies are being done about the size and capabilities of the Russian submarine fleet and where exactly their operations will, their operating areas will take place. So the lessons of the Second World War are reexamined and they realize very quickly that the submarine threat will be just like in the Second World War widespread and it will come right to the eastern seaboard of the United States. In the west coast it will also be very widespread and the potential is there although to a lesser extent of submarine operations off Canada's west coast; but being a North Atlantic alliance the focus for Canada is in the Atlantic. So as time marches on through the early to the mid fifties the Canadians are learning very quickly about fourth generation and what type of effort will it take to locate and destroy the types of submarines that the Russians are producing which essentially are better than German World War Two U2 boats and they're better because a lot of technology transfer for the latest German submarines went directly to the Russians.

So the Canadian leadership was very concerned about these submarines and the, the concept behind ASW operations was high intensity and maintain that intensity because in this day and age we're still talking about diesel electric submarines that have finite endurance. They're better endurance, tactical endurance than what we had encountered previously but if you can keep that submarine down and force it to exhaust its supplies of air and electrical power, sooner or later that submarine must come to the surface. There are some formulae that were used to dictate how strong in terms of numbers the escort group had to be. So if you did the simple math and the threat analysis told you that the Russians are going to be able to put in an order of ten to twenty submarines into the western Atlantic that meant you needed in the order of four to six, maybe even eight, escorts per attacking submarine. So very quickly the simple math shows to the Supreme Allied Commander Atlantic, who's an American at this time, that the number of anti-submarine escorts is inadequate. How are they going to overcome this problem? The answer is operational logistics. The reason the answer is operational logistics is the tactical endurance for high intensity operations is too low and the escorts would have to detach from that operating

group that was what we'd call prosecuting the Russian submarine to go back for fuel. There's a lot of high speed operations being done and then the realization comes that in order to replace between three escorts per group at a cost of a number of millions each, it's far cheaper to procure three replenishment ships that can re-supply the fuel that's being burned at a vastly lower cost. So the proposal goes forward to government in the late fifties and early sixties, before the Cuban missile crisis, that this is in economical means and will avoid much higher expenditures for requiring more anti-submarine escorts. So that's, that's the general logic that results in the procurement. First of only one, the government doesn't accept the logic fully and says, perhaps reasonably, that we will allow the development of one ship for you to trial and test the concept and then depending on what happens with that trialing and testing process we will consider again the procurement of the other two. What happens in the meantime is the Cuban missile crisis.

INTERVIEWER: Just a, a question that comes to mind is what was going on in the Royal Navy at this time? Do you have any insights into that?

HANSEN: Oh yes very definitely. The Royal Navy's formative experience with operational logistics actually happens in the Pacific rather than in the North Atlantic. When they deployed the far eastern fleet to cooperate with the U.S. Fifth and Seventh fleets when they were in the final stages of that war and the Royal Navy very quickly came to the realization that their operational logistical means were completely inadequate to operating that far from a supporting base because their nearest supporting bases were in India or Australia. So half a hemisphere away and operating alongside the U.S. Navy which had vastly greater logistical means and were closer to their sustaining national bases, they found that they were in serious trouble. If you read the good analytical works on the Royal Navy at that time they were teetering on the brink of collapse when the atomic bomb was finally dropped. So they learned, they analyze all of this and they learn this lesson about the need for operational logistics and during the Korean War. The Korean War re-enforces very strongly for the Royal Navy the need to have the right numbers of tankers, the right capacity, the transfer rates etc.

They still adhere however to the astern replenishment method. They are really reluctant to depart from it and I have seen files that the Canadian Naval staff was looking at, at the time of the research that was going into developing *PROVIDER* and they have replenished both from American and British means during the Korean War and found that the Americans are vastly more proficient, that their fuel transfer rates are twice or three times as high. So it becomes quite clear to the Canadians that if they're going to go down this road of procuring their own ship then the best lessons to be learned are coming out of the United States Navy not the Royal Navy. So it goes when *PROVIDER* is being developed one of the biggest mythologies that exist today in the Canadian Navy is that the replenishment ship, the *PROVIDER* type of replenishment ship is the Canadian development, that the Canadians are the authors of the one stop replenishment ship and this is quite painfully untrue. All of the files that relate to *PROVIDER* show a steady stream of reports coming back to Canada both from the Naval attaché in Washington and from a number of, of liaison and attaché officers that were sent out to various ships in the U.S. Fleet to watch the operations of their latest replenishment ships and so things like the bell and probe receiver, the ram tensioning devices, the hose saddles and the hoses are still from the original British pattern but they are now of a larger diameter. The Americans have gone to a larger diameter hoses to get

more capacity and the reports show that Canadians from both the National Headquarters in Ottawa and from the embassy in Washington were sent out a number of times to the American ships there were trialing this newest technology and we simply adopted it from American sources.

In fact the credit for the first multi cargo replenishment ship belongs to the Kriegsmarine. The Kriegsmarine of the Second World War had five Dithmarschen class replenishment ships - pretty comparable in today's terminology to our existing oiler replenishment ships. In terms of size I think they were only a few thousand tons smaller but they were longer, much leaner twin shaft propulsions of faster ships but they carried multi cargo products. They also had workshops on board, medical facilities and the like, and these were, they were civilian class ships but built to naval standards. So the credit for the multi cargo replenishment ship belongs to the German Navy of the Second World War.

INTERVIEWER: To what extent do you think the Americans were looking at the German mode, or was it purely an independent U.S. creation?

HANSEN: Two of these Dithmarschen class ships survived the war and upon the German surrender one each was given to the United States Navy and the Royal Navy for evaluation. The Royal Navy was working on their ship when they had a catastrophic fuel venting problem which led to an explosion and the destruction of the ship. The American ship fairs much better and USS *CONECUH*, was the name of the vessel, was given the designation AOR 1 and she was the first ship, it was later changed to AOR 110, but she was the very first multi-cargo, by design, ship. The Americans did quite a lot of changing to her rigging and equipments onboard because some of it was very old and worn after the war of course but they put this ship in to service with their Mediterranean fleet, ran it for eighteen months, learned a lot of lessons. This would be in the late fifties. There's a chapter in Wildenberg's book *Gray Steel and Black Oil* all about that one particular ship. The first files when you look at records in the National Archives about *PROVIDER* reference the files coming back from sixth fleet and sixth fleet service force about AOR110 USS *CONECUH*. So the historical trail, the documentation, clearly indicates that we are going through the United States to get access to the latest and greatest technologies but in the American experience the line of discovery and inquiry points clearly back to the German Navy's Dithmarschen class replenishment ships.

INTERVIEWER: Just want to clarify one point and that is was the deck equipment in *PROVIDER* a copy of the American system or was that Canadian or British design or are they pretty well identical as far as, as underway replenishment go?

HANSEN: The deck equipment and I think by this you mean the tensioning devices, the span wires the..., all of these things go back to the United States Navy including the bell mouth receivers and so forth. In my research the only piece of equipment, major piece of equipment, that I can identify as being purely Canadian in origin was the kingpost device that was installed on Canadian destroyer escorts and they were located aft as a means of giving an after point for the transfer of solid cargo. So food, ammunition as opposed to fuel, which was transferred forward again at that top part ship where the boat deck was.

INTERVIEWER: Those kingposts could probably be the subject of another interview because they certainly in my experience were a bit of a Rube Goldberg...

HANSEN: The documentary record which I have examined is not flattering. The foundry from Montreal which was meant to produce it was late with the installation of every piece of equipment. The contract was negotiated on very optimistic terms about development and delivery. They had major problems with the device, which appears I would estimate, to have been a rush job to meet these development deadlines because a lot of the replenishment capability is hanging in the balance. If you don't get this the only thing you can transfer is fuel and so you're only dealing with one aspect of tactical endurance. It's the most critical one, fuel is no doubt, but if you're going to have the evidence to show to government that you want to have the other two ships provided in development then you need... and the proof is going to come from experimentation in active service then you've got to have the kingpost device.

INTERVIEWER: But to be clear the kingpost was in the receiving ship not the sending ship.

HANSEN: Absolutely correct yes. So the plan had been to justify to government the construction of the other two ships based on the operational experience and trials done in *PROVIDER* and she was going to be the proof of concept for the other two ships but before *PROVIDER* can be delivered comes the Cuban missile crisis in 1962 and by this point the threat from Russian submarines includes nuclear weapons, missiles and torpedoes. Although during the missile crisis the submarines that we were dealing with were not nuclear missile firing, they were simply attack submarines and conventionally powered ones at that. What happens is that the actual operations demonstrate, as if it needed any more proving, the extraordinary rates at which fuel is being consumed in operations against an evasive and well equipped enemy commander and so the escort groups which are deployed off of the east coast of Canada and some of our ships actually went further south which allowed USN units to redeploy to the blockade operation off of Cuba. Peter Haydon's book on the Cuban missile crisis explains all of this, showed that fuel consumption was a very big problem.

BONAVENTURE at the time was in the United Kingdom having been on a naval exercise with a number of her tribal class destroyers which were.. - that was how it was planned. The carrier would have the big destroyers and the other groups would be based on the Prestonian class frigates and some of the newly arriving Saint Laurent class destroyer escorts. When she came back from the U.K. she actually had to pass through her operating area which was to be assigned her, come back to Halifax, replenish and go back to sea to take up her operating area because her tactical endurance even though she was a very major warship the speed and the weather construed against her and drove up the fuel consumption to the point where she could not; she had to go right through where she would have been operating. So she refueled went back to sea and this equation that saw numbers of ships coming back to replenish serially in Halifax and go back to sea fulfills itself.

So by the time the Cuban missile crisis ends, a period approximately ten days to two weeks, all of the escort groups including *PROVIDER* and her group are out of fuel and they must return. So it was an endurance test that the Navy passed by the narrowest of margins so the potential for

catastrophic failure based on low fuel capacity, low tactical endurance is identified very clearly. The Navy owns up to this honestly and completely above board goes to the government and says here's the proof that we need to justify the addition of two more replenishment ships to our inventory because of what went on in a real cold war context.

Now it should be understood that the operating areas that the tankers are planned to support are a mere 250 miles off the coast and so the, the usage rates of stores that the ship will carry are based upon the assumptions of how fast the ship can go back and forth and replenish these things. So as the Cold War progresses logically we see the Russians making greater and greater advances and eventually nuclear propulsion comes on the scene and so the need for operational sustainment is greatly magnified but there's never any talk of more sustainment ships. The Navy has achieved what it thinks is a reasonable target and the designs have proven to be flexible enough that they can meet whatever perceived demand and a little bit of wishful thinking and knocking on wood they carry on.

The interesting thing about this period though is you'd think that the need for higher endurance by Canada's warships would have registered, but in fact the opposite is the truth. We can see by analyzing the fuel capacity of the destroyers and frigates that are being built that based on whether you look at it in terms of practical endurance or amount of fuel carried per ton of ship or length of ship the numbers are dropping steadily. So the sustainment capability provided by the, the replenishment ships is actually more critically important to the Navy in its antisubmarine role rather than less if you had built ships with greater fuel capacity and better endurance. As the Cold War develops NATO is moving further and further afield and at the end of the Cold War out of area operations by the NATO groups become common so range and endurance become absolutely critical planning factors for post-Cold War deployment planning.

INTERVIEWER: Now the account you've just given begs the question had the Cuban missile crisis not occurred would *PROTECTOR* and *PRESERVER* ever have been built or would they have been built eventually but we would have gotten it considerably later? It's a hypothetical question but I...

HANSEN: Okay speaking hypothetically my answer is yes. I say that because the replenishment capability, or sorry, the expanded capacity of the Navy that comes with replenishment is truly a force multiplier; that the calculus about how many escorts one replenishment ship was worth was at least as good as the calculations were made and that there were a number of other advantages that came from having that sustainment capability because the *PROVIDER* actually represents more than just sustainment; she is a supply distribution point, she is an aircraft maintenance facility. So she has both the sustainment capacity but also supply and support in limited degrees built into her so the force multiplication value of the replenishment ship would eventually have produced the proof needed to justify the other two ships. I'm pretty confident of that prediction.

INTERVIEWER: But the Cuban missile crisis was perhaps a bit of an impetus?

HANSEN: It was, absolutely, it was central. It was central in the argument it was made by the Navy to justify the other two ships.

INTERVIEWER: Very interesting. I'd like to turn to industry's involvement, Canadian industry involvement. Do you have any thoughts on that? Obviously you know ships were built, equipment are built in Canadian industry. What impact did this have on the Canadian industry in your estimation?

HANSEN: I think it had a significant impact from the point of view of technology transfer. The Canadians became very integrated with the American Navy who was busy promoting a technological advancement from a not very practical perspective. It wasn't high tech weaponry and it wasn't nuclear propulsion although there was talk at some point of Canada's replenishment ships being nuclear propelled. This idea seems to have been dropped pretty quickly but it is a really interesting side note to the whole discussion of replenishment ships. The Canadians see the kind of relationship that is going on between the United States Navy and companies in the United States like Aeroquip for example which had offices in Ohio and in California. Aeroquip is the company that develops the bell mouth and probe receiver equipments and the experimentation process that's going on. So new technology is developed and it's installed in American ships and they watch this process taking place and how closely industry works together with military in refining requirements and coming up with practical solutions. I think personally that's the biggest advantage apart from the cutting of steel and launching the 22,000 ton ship.

INTERVIEWER: It's often been said that certainly you know through the Cold War I think that the military led a lot of technological breakthroughs but I think you're giving an example of a very early instance where perhaps it was the other way around; would that be fair?

HANSEN: The conceptual need was defined by the USN, by the navies generally, but principally the USN and that came from their real world experience during the Second World War especially in the Pacific although the Atlantic played a major part as well. But also post war when they're realizing through academic and scientific analysis, a lot of it done at the U.S. Naval War College, that a need exists and so they're looking for solutions to problems. The bell mouth and probe receiver system is arrived at because they recognize that the time taken to manhandle hoses that involved between two and three hundred pound metal fittings on the end took simply too long. There is documental evidence that the Canadians are recognizing this as well but they don't have that kind of rapport with industry that they can go to them and say, "We need a solution to this specific problem. How would you deal with this conceptual need on our part?" Whereas the Americans do. They very clearly have an intimate working relationship and the files that come from the Naval Attaché in Washington are just cover letters and then these enormous files from USN sources that list their industrial contacts, mailing addresses, names of principle officers etc. and it's basically being served up to us on a silver platter. Here if you want to solve these problems this is how to do it. Go and talk to these guys and Aeroquip actually opens a Canadian office in Toronto. You can still find the street address; xxx or some place, where Aeroquip opened a Canadian office and they said here we are we're ready to do business with you and it should be mutually advantageous.

INTERVIEWER: Is it fair to say that the technology of a bell and probe receiver had its origins in inflight refueling?

HANSEN: That I do not know. I cannot..., I went back looking through the records for that and I cannot find anything that indicates that so I cannot say definitely one way or the other.

INTERVIEWER: My intuition tells me that, that's probably the origin but I don't have any documentary evidence either so we'll have to leave,

HANSEN: Yes.

INTERVIEWER: that one for, for somebody else to, to look in to. Okay well I think we're at pretty well at the closure of this sort of historical perspective which I think has been excellent. I'd just like to get your thoughts on just reflecting on everything we've talked about for the last little while. What were the successes and the failures and perhaps some of the myths, I think you, you indicated one myth that was gotten rid of, so do you have any final thoughts on the historical perspective?

HANSEN: Well going to the beginning with the Battle of the Atlantic I've written a major paper about the escort oilers and I attribute their impact on the eventual successful outcome of that major part of the war as being as important as any other development. So whether it's radar or antisubmarine weapons or group training or any other such thing I think the escort oilers are an untold part of that story of the Battle of the Atlantic and that this is important. An interesting side note that comes out of that was at one point the Royal Navy, the Admiralty puts out a new definition of an escort group which is that it is the group of warships plus two escort oilers. So the doctrinal conceptual nature of the group changes and it includes for the first time in Royal Navy history operational logistics as an integral part of an escort group because they recognize their tactical limitations.

Recognizing logistical factors as key to operations is an important issue. We in Canada have gone down a line of specialization for our operations officers that lead to ship command and ultimately flag command and it excludes that body of professional knowledge which was the reason why we tried to build it into the course content in Toronto. We had people who were tactically very proficient but operationally had no understanding of the importance of things like endurance to your prospects for tactical success because this simply is not treated in the history of the Canadian Navy. So whether you're a historian and looking at events from a purely academic or recreational historical perspective, or whether you're a professional military person looking at things like fleet mix planning, national strategic capability we still tend to have a focus on high end combat capability and everybody is seduced by the beauty of our weapons. Whereas in the post Cold War context what's really showing itself now in my studies as I continue to look at maritime security from a broad perspective is the need for logistical capacity.

So in the case of major disasters I mean we've just had one in Haiti [earthquake], we've got another one unfolding in Japan where hundreds of thousands are dead [tsunami], many hundreds

thousands more are displaced. What is needed is capacity, volumetric capacity. So what I was in the process of defining was the study of volumetrics. Where are the bottlenecks in the national capacity to deliver effect, whether that effect is for reconstruction or stabilization, a peacekeeping operation, a disaster relief operation etc.? The bottlenecks typically and Haiti shows this quite clearly that we as a western industrialized civilization should be able to do better than merely provide groups of working parties of sailors equipment hand tools. The factor that limited their effectiveness was this volumetric thing which is based on very limited logistical capacity in the Navy so we're now down to two replenishment ships and certainly our performance would have been much better if we had a third replenishment ship in the inventory and one available. Much more could have been done to alleviate suffering but I think that beyond that we need to start thinking more about what is Canada as a country. What do our people expect us to be able to do and how can the maritime services fill that need?

INTERVIEWER: Okay well I think we've touched somewhat on the lessons learned which is normally something we reserve for the conclusion of our interview but there is nothing lost by that. I want to go back to perhaps a more theoretical insight in to naval operational logistics. Could you talk about the factors which govern naval operational logistics? I think you've touched on them somewhat in the lessons learned but perhaps you could expand on those.

HANSEN: Well the planning for the deployment of a naval group away from its home sustaining base or at least so far away from its home sustaining base that returning is not convenient to replenish things that they have used in the course of operations is the heart of it. So there are a number of key questions that a planner needs to look at when they're setting out in the planning process to assess what's needed and what the demands are likely to be and the very first one is distance. How far away are we going to be and what is the state, what is the urgency of our getting there. So in global terms a, a fast ship can be anywhere in the world in three weeks but a warship if it's going to use high speed is going to have a very high fuel bill for that deployment at that kind of speed which means that operational sustainment if it's going to be deployed must be capable of the same types of transit speed otherwise it's going to be left falling astern. So that means that when you view documents that come from the archives and when they were looking at this idea of sustainment ships they set pretty much universally a minimal required speed of twenty knots because that is viewed in naval terms as being a brisk speed for transit.

Now the nature of the operating environment also has a big factor to play and so adverse winds, heavy seas not only do they reduce the speed at which you can proceed but high winds and heavy seas can also reduce or sorry rather increase your fuel consumption rates in the order of thirty to thirty five percent. So in combination the requirement for high speed and to have to proceed in a hostile environment, hostile in the essence of the weather conditions can drive the fuel requirement extremely high. So there's another issue. The third one is the duration of the deployment. Now we've gotten around a lot of the logistical problems that come up from long term durations by adopting as a concept standard six month deployment cycles. So wear and tear, consumption of critical commodities, accident damage arising from potentially enemy action, these are all dealt with by packaging the time down in to what's viewed as an acceptable or manageable time frame. The fourth and final factor is the intensity of the operation. So as we

saw in the example of the escort groups in the mid Atlantic during the Second World War contact with the enemy generally means higher speed for both the purpose of evasion if you wish to avoid or to allow aggressive tactics if an offensive posture is acceptable or worth the risk. So in either case the tactical situation which is created by the presence of the enemy also creates a demand for consumption that needs to be satisfied by supply. So, those four are the basic parameters that an operational planner should be looking at.

INTERVIEWER: Is there another, I wouldn't say force multiplier, but the setting up of a foreign operating base that's a, that helps in the solution does it not?

HANSEN: Absolutely it does and this has been the standard practice and in fact in the archival documents it's an assumption that the supply and support functions can be dealt with through that kind of an approach; that you could hire commercial transport or use airlift and create in an allied or at least a friendly disposed country some kind of mirror place that you can go and through commercial means can acquire maintenance work, supplies etc. Then the sustainment capability has far less distance to go in order to replenish itself because it actually represents the end of the supply chain. It is a consuming unit but it provides supply to the tactical forces.

INTERVIEWER: Another item we've got on our outline here that I'd like you to talk about is the influence of joint operations and their demand on naval operational logistics.

HANSEN: Right the Canadian Navy whether it was the Royal Canadian Navy or Maritime Command in the unified era looked at force employment from a very service-specific perspective and so whenever in the Cold War we were analyzing the need for operational logistics, it was viewed solely as the Navy's issue and the means of solving that problem were assets that were allocated to the Navy so the Maritime Operational Commander had control of operational logistics and it was up to him to make sure that the plans conformed to the means and the needs.

In the post Cold War situation where the emphasis has gone much more towards joint operations we now find that the lessons of naval operations and the peculiarities of the maritime environment are not as critical to a joint commander unless, if and unless, the sequence of actions require first maritime operations as a means of force projection or theatre entry. That only happens so rarely in scenarios that involve state on state conflict with major forces on either side capable of naval power projection and interdiction; naval interdiction from the other side.

So in the current security environment we find that the Navy is not as able to make the case from a military operational perspective that sustainment and support are purely naval requirements and so the assets that we are now in the process of replacing are being argued in favor of from a joint perspective. In fact the Joint Capabilities Board looks at all of these things from a joint perspective and says that they recognize the service requirement but in a new security environment the joint perspective must be the one that is used in the end to justify the acquisition. Understand all of that but what is being submerged in this discussion is it can occur, it can arise; that at a critical point in an expeditionary operation whether it's military, diplomatic or constabulary that it can come down to the point that the entire operation will rely absolutely critically upon the sustainment capacities that are built into the fleet and if they are inadequate or

too few number as we have seen from some of the other examples, the whole thing can fail because of that critical insufficiency that is accepted by all parties in the beginning. So the operational logistical capacity can have strategic impact. It certainly has tactical impact. We know that to be true. History has plenty of examples of that. What it doesn't have examples of yet from a Canadian perspective is evidence of strategic impact.

INTERVIEWER: I'd like to come back to lessons learned and do you have anything, any thoughts on the need for doctrinal guidance in the Navy? I'm sure you do on the subject of naval operational logistics of course.

HANSEN: Yes I definitely do and this actually brings this story full circle back to the point of departure which was my experience in the college in Toronto with the American studies program. We were in the process of trying to educate as opposed to train mid-career naval officers about everything that they needed in their professional acumen to engage in this joint discussion with their service fellows in Canada and beyond in a combined sense. So we found that the critical deficiency from our perspective as educators was doctrine. Canada has no naval operational doctrine and we had to create for our own educational perspective and purposes a doctrinal manual and basically we cribbed everything from American, Australian, Dutch and British sources and concocted, completely on our own authority, a document which we in our own efforts tailored to the Canadian audience.

Because American doctrine is written from the perspective of a maritime super power and so that doesn't translate easily to medium power officers and even some of our students from abroad who came from much less impressive means so we were struggling, we were struggling mightily with how to take the lessons of history and technical factors and planning processes and turn that into a really useful handbook that gave the conceptual guidance to officers that would have to do this kind of thing for real or at least for exercise in, in a future appointment – and bring these kinds of issues to the forefront of their process, their intellectual process when they were looking at things like expeditionary operations of the sort that we were getting into in this day and age. It was difficult, it was, we found that our credibility as mid ranking officers was insufficient in a lot of cases to overcome the tactical proclivities of Canadian Naval Officers who came to the college and were confronted with major expeditionary operative core level deployment operations. They had to sit down and plan out not only the operational requirements but the sea lift capacities as well and based on the consumption of a deployed force of a 120,000 people, multiple air wings, naval forces; a major problem. They were not interested and the need for doctrine which is espoused by the institution and validated means that they need also to recognize the doctrinal issues that are at play here; that in a conceptual way if you're going to plan an operation with very limited means what does that mean to the commander. Does he understand his limitations, does he understand the criticality of timing and risk and assets when the operation hangs in the balance? I'm not so sure they do and without that kind of doctrinal guidance it's hard for a mid ranking officer to get these points across to young students who are tactically proficient, but frankly ignorant doctrinally.

INTERVIEWER: The question I have is whether or not the logistics branch has a similar doctrinal gap to that of operational naval officers?

HANSEN: Well I think they do just from the other side of the fence so they're proficient in their own processes, institutional organization, operational management and tactical consumption and resupply but they don't understand it from the operator's perspective, which causes friction between the two communities. We saw it quite clearly in Toronto when we insisted that the logistic officers be integral to the operations planning groups. So we had the standards of a joint headquarters organizational structure and the N3 guys or the operations planners, and the N4, the logistical people and they would migrate to their opposite corners of the room and we would say, "No, no this is not the way it's going to work here. You are going to work cooperatively on organizing your resources and doing assessments of demand and supply and meeting the operational requirement." It came as quite a revelation to them that this was in fact a necessity. It's clearly been identified years past but we're talking here in the late nineties and early two thousand years because I left Toronto in 2006.

So the students would polarize, as they did on a lot of other things as well, but when it came to this business of operational logistics and the importance of cooperative processes in planning they would polarize very dramatically and the naysayers would say that this was log weany [logistics] stuff and why were they getting involved in it and wasn't there a spreadsheet that would just do it all for them. Then there were others who and it tended to split fairly evenly you know, a few numbers on either side and I think we ran the exercise, it was called Logistics Train then and I think we ran it four years before I left and the numbers would go up very slightly but generally they were polarized about half and half about the need to do this thing and its utility and applicability in other things besides purely military operations. What distresses me most now is that the maritime component program in Toronto is now gone; it has been discontinued and it is expected that naval officers will come to Toronto with the necessary professional acumen already in their possession to enter into joint planning, joint and combined planning processes before they arrive in Toronto and it was the Navy's way always up until this point, up until today, to get that in Toronto so they'd be tactically proficient but they would not understand operational concepts and doctrine that was going to be acquired in Toronto. To this day the Navy has no plan to replace that lost program in Toronto and this worries me greatly.

INTERVIEWER: That's interesting because the Army has always had its staff college separate from the tri-service staff college so this was perhaps a way of the purple machine forcing the Navy into that model.

HANSEN: Well the purple machine is still forcing the Navy. The Air Force has been forced and they are in the process now of creating an institutional equivalent to the Army's junior land college which is in Kingston and the Air Force is in the process of creating their program and as I understand it now it will be in Winnipeg with the Air Division headquarters so what the Navy will ultimately do I don't know. There's been absolutely no talk about it that has come to my ears but I certainly await with interest to see what eventually will develop.

INTERVIEWER: I think we're just about at the end Ken, but before we close I wonder if you could give us some idea as to areas for further study in this. I know you've done an awful lot of work on it but there's obviously a lot more work to be done.

HANSEN: Well I agree that there is more work to be done and the reason need exists is because we're in a period of really dramatic change and I mean that from every factor, economics, politics, technology, sociology etc. Our world is changing at a very great rate and so relying on what we believe to be valid knowledge whether it comes from our history or our past practices is dangerous. To position ourselves best for change means we need to emphasize intellectual pursuit, but not from a high theoretical perspective alone, but from an operational conceptual nature. So professionals and academics are needed in teams to analyze problems like the rise of joint operations in the Canadian Forces and what that should imply for the national industrial base, for the composition and capabilities of operational forces, and things like tactical limitations in ships.

We are now looking at replacing all of the major surface combatants in the Canadian Navy and I personally am strongly of the opinion that they need to be made as capacious as possible so they can have the maximum tactical endurance that gives them the greatest flexible envelope for employment. This does two things. It increases your tactical capacity to move and to stay, to have you know, to have presence and it also reduces the demand that those tactical operating forces will have on the capacities of what is now a joint operational logistical capability. So it could happen by unhappy consequence or combination of events that the Navy's joint logistical capability is engaged in a land oriented pursuit and they are simply not available or at least not immediately available for the Navy's need. That puts enormous importance on tactical endurance. The Navy will probably have to get by on their own means for a protracted period of time and that could be the critical period.

So what kinds of things can we envision or can we learn from other people that have the same problem. Well the Germans for example were refueling submarines with other submarines. Why is it inconceivable that we have surface forces that are incapable of doing the same thing; that operating units could transfer fuel, food, ammunition to each other as the need arises and send one of their own number back for replenishment purpose to whatever forward site is available. It serves no purpose to eliminate that possibility by building ships without the volumetric capacity. So now the volumetrics which were being solved in the Cold War era by the largest capacity in a single package which had problems of vulnerability, created a risk, is being not replaced completely but being supplemented and so we can bridge those periods of no supply with you know meager but sufficient supply.

The other issue is efficiency in operation. You can build ships and propulsion systems that perform better within ranges of speed and ranges of physical conditions. The problem is that the characteristics that calls for, are less in comparison with the types of warships we've built before. So they are not as fast, they are not as completely maneuverable. They may have slightly less in the way of magazine capacity for ammunition. You've replaced that with capacity for other commodities which may be more important in the joint context. I'm concerned that conventionality will say we must recreate the Navy of the past because it served us well and we therefore should not depart from that. That does not recognize the impetus for change which in my view is of strategic consequence.

INTERVIEWER: Ken I'm delighted with that conclusion because what you've done is I think you've, you've issued a challenge to, for the Navy to look at a paradigm shift. We started off with this whole interview with the importance of AORs as we call them, logistics, supply ships being force multipliers and as a result of lessons learned we did finally get into the act, but I think putting this last focus on what we need in a tactical platform from a logistics sustainability point of view is really, really interesting and I think excellent food for thought for future academics.

HANSEN: Thank you very much Roger.

INTERVIEWER: Thank you very much.

HANSEN: My pleasure.

Interview ends

ABBREVIATIONS AND ACRONYMS

AOR	Ammunition and oil replenishment ship
ASW	Antisubmarine Warfare
NATO	North Atlantic Treaty Organization
RN	Royal Navy
USN	United States Navy