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INTERVIEW TRANSCRIPT

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INTERVIEWEE: Joseph Sosnkowski

INTERVIEWER: Glenn Cook

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By Glenn Cook

INTERVIEWER: This is a Canadian War Museum Oral History Interview with Joseph Sosnkowski. Joe was the key test pilot involved in the development and evaluation of the Haul Down Beartrap System originally introduced on destroyers of the Royal Canadian Navy. History has shown that this was a remarkably successful undertaking. Joe has joined us today to discuss aspects of this development program, the challenges that were over come and indeed the features introduced which have permitted the SEA KING to operate in all weather, day or night and in almost any sea state from Canadian destroyers at sea.

Joe I know the focus of the interview is on the work that you did for the Haul Down System in the 1960s but I think the listener would like to have a picture of your total career and I wonder perhaps if you could indicate why and how you joined the Canadian Navy and a little bit about your career until your retirement?

SOSNKOWSKI: I'll start by giving you my name again it's Joseph Sosnkowski, in Polish the W is pronounced like an F. I was born in Zakopane, Poland in 1932 arrived after a few adventures in Canada in 1940 as an eight year old, went to school. Then at the end of high school proceeded to Royal Roads in 1949. Now why I did that - I guess my brother was in the navy and I always had an interest in the navy so I ended up being a midshipman in her Majesty's Canadian service. That started it off and was shortly followed by the trip into Ontario, the Royal trip and that was followed by a year - year and a half in England doing what they called sub lieutenant courses. During these courses I got the chance to go flying and I decided that I really like this type of work so at the end of these courses I put in a memo saying I'd like to go flying.

Came back to Canada and did all the usual things, got my watch keeping ticket and went around the island 32 times with cadets and fired guns and did all good navy things. About half way through one trip we got indication that I was to pack my bags and be on an airplane within a day and a half on my way down to do flight training.

Flight training took place in Pensacola area down in Florida, very interesting. My first base down there had 400 HARVARDS on it, you can imagine what went on, there were two fields with 200 each. My first carrier landings, believe it or not were done in a HARVARD or the American Navy version of it called the SNJ. Again that was a delightful experience and thanks to some very good work by the LSO I managed to ace my test and six out of six carrier landings without a wave off.

That was followed very shortly there after by returning back to Canada and getting into the BANSHEE program in 879 Squadron. While the squadron lasted I have to admit that I thoroughly enjoyed myself that was good work. The squadron folded unfortunately due to money problems with the navy and a few other things. So from there I went to experimental

squadron ten (VX 10) which was a very, very good move on my part. Because it was there that I really got interested in test flying and applied and was selected to go down to Patuxent River in 1960 and take the test pilots course. That was three years I spent down there.

At that time we were buying a new helicopter, I noticed we still are, but somebody had smarts because they sent me down there and I had qualified on helicopters before I went down. While down there of course the United States Navy (USN) proved to very gracious hosts. I did some good work for them mind you but they let me fly anything I wanted to. They didn't mind, as long as I went through proper channels, what kind of reports I sent back to Ottawa. It was quite fortuitous and I certainly took advantage of it, there was a monthly report went back to Ottawa for the whole time I was down there.

At the end of that period the decision was made to by the HS2 and the Helicopter Haul Down was coming into fore. I was called back to VX 10 and was told that I was going to be the project pilot on this and to please compile a plan of action of how we were going to do the testing and evaluation. Well being myself I thoroughly enjoyed my time off much to the dismay of the commanding officer (Shel Rowl?) until finally I sat down one day and started, it took about a day and a night and produced a plan. Which with minor modifications was accepted and some parts of it are being used to this day. From there I went back and we had a bunch of acceptances to do on the first Canadian HS2s. Sort of bouncing back and forth between SHEARWATER, the factory and Patuxent River.

Well carrying on with my career or lack there of. After we finished the Haul Down Trails and all the rest of it I went to Staff College in Grenich. Came back and was sent to an unusual situation where a group of officers, under one general, were looking at educational systems in the Canadian Forces. Well there were some very interesting things that fell out of that, however, one year there and then back to test flying. I joined CP or AETE and stayed there for two years until they moved to Cold Lake, Alberta. I decided it was time to go operational again having bribed my poster in Ottawa with a jug of beer and some smoked meat sandwiches I got sent to Bagotville to fly CF101s. Prior to Bagotville I was sent on a french language course because I was going to Bagotville. However, half way through the french language course I got a message sorry about that you must report to Bagotville immediately because we are sending you out to the Comox on the West Coast. Well my reaction to that was well, nail me to the cross again please.

Flew Voodoos for a couple of years out here on the west coast. Again it was a totally different type of operation but exciting and lots of fun and that airplane had some very bad habits but it had some very good weapon system.

Somebody in headquarters thought I was having too much fun so they decided to send me on a six month sojourn to the beautiful highlands of Vietnam on a Peacekeeping mission. That was the time we were down there to get the American prisoners of war out. I spent six months there and all I really want to say about it is that it was an experience. Came back to Canada, got posted out of the squadron to North Bay where I was promoted to lieutenant colonel. Proceeded to spend a couple of years in North Bay doing exercises.

Exercise was good, again you got a good view of how NORAD worked and all the stresses and strains and everything else that was going on. But somebody thought kindly of me and they sent me back to Bagotville in command of 425 AWF Squadron - The Alouettes. One of the most enjoyable periods of my life. Two years in command, took advantage of every

opportunity offered and had fun and even got my squadron down to Bermuda to make like missiles for the Canadian Navy.

All good things have to come to an end but at the end of that time I was sent to the Air Warfare Course in Cranwell, England. Which was again an interesting (intereggdom?) got to know the Brits quite well. Enjoyed myself, learned a few things and generally just had a pretty good time. However, for that you pay because my posting back to Canada was to an outfit called OSMET and I'm sure that any military person will recognize what OSMET is so I won't go into it. You can imagine what my credibility rating was in Val Cartier when I went up there to evaluate their personnel requirements. Here is a naval aviator evaluating a French Canadian Army base - including the Vandoos. His name is Sosnkowski, so you can imagine what credibility I had but we did our best and ended up doing a fairly good job.

From there after a little bit of string pulling I was sent to Ramstein, which is headquarters of Allied Air Forces Central Europe to become a planner. Four years in Europe were just delicious, amazing what you could see and what you could do. Ramstein being in the western part of Germany just next to France very close to Mets you were in the centre of Europe and you were no more than a couple of hours away from anywhere you wanted to go. That was a very good (intereggdom?) also.

From there I went on my last posting to Rome, New York and the 24th NORAD region. The job I was given there was an Assistant Deputy Chief of Staff for Operations. Like most American descriptions of job, it sounds great you put the initials together and you got a title that's about a mile long but all it really meant was that I was a gopher. But I was an operational gopher. It was fun there too because the Russians were probing. You got into the action you sat in the middle you scrambled all kinds of fighters and you intercepted Russians then you worried about them getting back because they were out of range of radar and radio. There was enough excitement to go around. Well like all good things that had to come to an end too and retirement came in 1987 and it happened at CFB Comox back here on the west coast.

COOK: Joe, you became a relatively famous within the Canadian Forces because I believe you topped the USN Test Pilot School, both academically and from a performance perspective. I wonder perhaps if you would give the listener a cross section of the airplanes that you've flown over your career and the number of hours you got and the types of machines?

SOSNKOWSKI: I was lucky enough, and I sincerely mean that, I was lucky enough in Patuxent River to be chosen as the outstanding student from my class which was a great honour and totally unexpected. As to the airplanes I've flown, well my answer to that is really you name it I've flown it, probably, at least for my era. But they cover everything from light aircraft such as the Auster AUTOCAR, some bi planes to four engine props, big heavies, P3As and sort of everything in between, helicopters, fighters, jets. Basically I was jet fighter pilot but I managed to dabble in just about everything. The best day I ever had was flying at below sea level that's not real sea level but standard sea level, at minus 25 knots to mach 2.2 plus at 40,000 feet in four different types of aircraft in one day. So it covered the spectrum pretty well.

COOK: That concludes your personal biography, for which I thank you. I wonder if we could move into the core portion of the interview, I wonder if you could start off by giving us an

picture of VX 10 Squadron from an organization and reporting perspective?

SOSNKOWSKI: VX 10 Squadron was a funny animal really because it had two bosses. It was structured like a normal squadron except instead of operations - test, evaluation and engineering were the main thrust of what the squadron did. Reporting wise it reported to two entities one the engineering side of the house and two the operational side of the house where it had to respond to their needs. But your PERs personnel evaluations were written by operational people. So the CO was written up by the CO of the base and then to the admiral and that was the chain of command.

Now the chain of tasking came from Ottawa, the squadron was tasked by what they called Project Directives. It started in Ottawa but it really started with an operational requirement that went to Ottawa. Ottawa had a look at it came out as a project directive and we ran with it. Now the squadron was not very big but personnel understood what we were doing and people were chosen to join the squadron with care. We had a pretty outstanding group of people.

The training involved, we had operational pilots who's background was totally operational and then we had others like myself who had operational experience but also was trained in a specific area of test flying. An example, a typical project would start with a stated operational requirement which then was translated in Ottawa to a project directive giving us specifics of what they wanted us to check and to see if the requirement was really valid or invalid or required at all. As soon as we got the project directive, a team was formed, had a look at it, we analyzed it and we sat down and made a plan of action. Proposed a plan of action, stating the requirements both in equipment, personnel and money.

Now this plan had to be approved in house through the chain of command but then it would go back to Ottawa, to the engineering side of headquarters. Who looked at it and modified it as they saw fit, usually consulting us first of course then came back as a finalized project directive and the project then went ahead. We started flying, writing, making bits and pieces if required until it was finished. At the end of it came the hard part because then we had to sit down and write a final report. Whether this particular project was suitable for service, in other words was this piece of gear or this airplane or whatever was it suitable for service use, where it would be used throughout the navy or not. Or if it had suitability if it was okay but needed more work on it that would be brought out also. That was basically the end of the project but of course like anything else these are like (am a bee?) you'd finish one project and you get two back.
So that gives you an idea of how the process worked. In that context one of the major projects that the squadron was involved in was the Project Directive 102 which was the Beartrap and Haul Down Trials which came our way. That was really a major one.

That gives you an idea of how the unit worked and what we did and I'd like to stop on that (kemit?) right here if I can.

INTERVIEWER: Joe I wonder if we could move into the Haul Down System itself, and before we do, perhaps you could give the listener a perspective. What we have is two vehicles both with different motions and we are trying to marry those motions together so they are both one in the end. Could you take it from here and provide us with a description of the two vehicles?

SOSNKOWSKI: Well we'll try it's forty years ago this happened so it's hard but not to worry.

The ship itself DDE, nominal displacement of 2,630 tons with an overall length of 366 feet and a beam of 42 feet maximum. Now it sounds like a lot but that's a pretty dam small ship really. Now the deck size itself was 78 feet 2 inches by 39 feet 11 inches just to give you a rough idea which is way less than a third of the length of the ship. We had a control console for controlling things going on the deck. That included haul down and the traverse control for the Beartrap which we will come to later. The aviation fuel on the ship was 5,000 gallons of JP5 not too much but then more than enough for the normal operations that the RCN undertook. On the flight deck itself you had the haul down equipment which was basically the Beartrap that had a wire running through the centre of it which down to the haul down cable and another wire that was on either end of it that pulled it back and forth. A very simplified description of something that was very, very complicated.

The test equipment on board the ship itself was an oscillograph that recorded certain parameters we were interested in such as ships roll, heave, pitch, yaw, plus a few other things to do with the winches for the haul down. In addition to all this the ship was stabilized in roll. It had stabilizers that definitely were a help in controlling how fast and how far the ship rolled.

Now I'd like to talk about our helicopter the SEA KING. First of all you have to realize it is not a small machine it is 54 feet 10.5 inches long, it is 16 feet 3 inches wide and it's height the tip of the tail rotor is 16 feet 8 inches. Give you an idea of what perspectives and the things that we were working with that if you remember the deck size well also part of the deck is the hangar forward of it. Originally the doors of the hangar were only 17 feet high, so you only had a two inch clearance to work with. That changed of course. But the helicopter is a big machine, compared to ship which is a relatively small ship you are faced with the problem of how you are going to operate a very large helicopter off a very small platform. Now the equipment on the helicopter itself, of course it is a navy helicopter so everything folds. You've got folding blades, folding tail and for this project we had to add tail probe, main probe, cockpit instrumentation and cockpit panel indicators to show you what the systems were doing and whether they were okay to use or not. Specialized - there was an oscillograph and photo panel in the airplane and the oscillograph was tied to the oscillograph in the ship so you had a common time line by radio which was a standard way of doing it so that the engineers could have a look at the oscillograph traces and say okay when the ship was doing this the helicopter was going that and they were correlated.

All of this you've got remember what the idea really was how do you handle this beast on a small destroyer that is pitching, rolling, yawing and blowing smoke in your face and all the rest of it. The thrust of it is how do you go about making this thing work.

Okay so how do we make it work? Well first of all we will go into some of the descriptions of the duties of the various people involved. For instance we have a most important member of the crew who is really your major interface between the helicopter and the ship is what we called the Landing Signals Officer (LSO) which we borrowed from the fixed wing side of carrier aviation. But he is the fellow who basically controls when you land and take off. He is also very much in control of what goes on the flight deck in preparation and after flight so he's a pretty busy boy. The pilots well they had their duties, normal - first of all not to crash. Secondly, to carry out what ever tests were required in the flying side, keep everything safe. That was very much the duty of the LSO.

Now the test engineers analyzed all the data that we took and came to conclusions where

things were working properly or not. Then in the ship the person we talked to the most was the bridge watch keeper who of course was controlling the ship at the time. They had to be in the picture of exactly what was happening back there because they had to control where the ship was going, how fast it was going, whether the stabilizers were on and off and a myriad of operational requirements. It had to be a real team - especially at the beginning because we were exploring an area that had not really been previously explored. It was all new to both the sea going navy and to the air side of it. Certainly it was new of the sizes and equipment involved.

Every flight was preceded by a briefing which covered exactly what we were trying to do, what test points we wanted to hit and the procedures to be followed, then you go and fly. At the end of you sit down and debrief much the same things what you wanted to get done you didn't get done and what you wanted to get done you did get done. What the problems were with the ship or the helicopter. It had to be a really frank and open exchange because if you tried to slough something off it came back and bit you. Everybody was good, the ships company was very, very good that way and of course we were very well prepared.

I think now is a good time to start talking about project directive 102 which is the big one we are all interested in and sort of how it came into being. Well the RCN, as soon as it got into the air side of operating, had an interest in marrying helicopters with small ships. Why? Because basically we were a small ship navy and two that was a real force multiplier for them. Interest in this type of operation goes back quite a ways and there are predecessors to the HS2 which was the HORSE the H04S3 Sikorsky that did some preliminary trials on HMCS BUCKINGHAM which was a frigate that had a real (buckshee?) deck put on it. The people who did it admitted it was an interesting operation but it really wasn't operational because they had no equipment it was basically just a flat spot. That was sort of the predecessor to the PD102. When we got the big helicopter and we started getting the modern DDEs then it really started looking at making this force multiplier for no other reasons than the nuclear submarines were coming in and of course they out classed anything that floated on the ocean. We badly needed something to try and counter that. The result was DDE CHS2 marriage.

Well we started, as I said, by getting a project directive from headquarters saying that this is what they'd like to do. At that time I was down in Patuxent River and I was called back to VX 10 to basically write the flying portion of the trials that we were going to do. Now whatever I wrote had to be married to the engineering side because the better portion of the whole project was really testing the equipment that we were supposed to get. That included the airplane and the whole system so the flying was really only one part of it. But that was my side so as I mentioned before on that trip back to VX 10 I was the despair of the Commanding Officer Shel Rowl but we managed.

After that I went back to Patuxent River there was other things going on and we were buying HS2s and we were setting up training programs for the introduction of the HS2 to the RCN and all kinds of other things going on. A stint at Sikorsky aircraft factory was interesting too because you saw the things being built and some of the other stuff that was going on there. Just as a small aside the CRANE was being built at the time and as you remember it was even bigger than the HS2 and when you walked into the hangar and took your first look at it invariably there was a Holy Christmas! It got the name of the saviour for the company that is, but it was a strange machine and it worked beautifully. One other incident down at the factory is I walked in and had a looked at it at this CRANE, took a look at the tail rotor,

turned around to their chief test pilot and said "I think your tail rotor blades are put on wrong." He took one look and said "oh my God they were." But that was another triumph of engineering because you could put them on either way. All it was, was two bolts.

But back to our problems. We bought the first four helicopters from Sikorsky the rest were made up in Canada. The project directive kept perking along it was approved in Ottawa and then back and then people started getting busy building things. Ships being modified and hardware being put on and helicopters being bought and training beginning. Somewhere in there my stint down in the states finished and I was back at VX 10 for good. That's when we started putting into practice what we all had written with prior approval of course. We had one HS2 assigned to us CHS2 4003 which was my airplane and we started flying.

The project flying actually started 15 October, 1963 and went on pretty steady until 6 August, 1964. Now this is a strange project because the complexity of it had sort of interrupt spots and basically where flying and testing stopped and then you wrote all about these things and then fixes came in. It wasn't a clear smooth straight line and in some aspects it's not even finished now because there were still improvements to be made. However, that was the basic period where we proved out the initial operating envelope of both the ship and the helicopter operating envelope for the combination.

It started off on the button of one of SHEARWATER's runways because we had sort of a jury rig in there we had the helicopter. You could tell what you would be facing when you got to the ship and the actual haul down system. So there was some sort of a jury rig with a wire running up and we tried to simulate what would be going on, on the ship. The first thing we found out is that this helicopter builds up an enormous charge of static electricity because we lowered our messenger cable and the person on the ground grabbed it and promptly got knocked flat on his back that was step one. It was one of the very first things we discovered, it was easy to cure, but I mean it was a discovery that people didn't know about before.

INTERVIEWER: This is the Joe Sosnkowski interview, this is the end of tape one side one.

This the Joe Sosnkowski interview this is the start of tape one side two.

SOSNKOWSKI: Now that exercise gave us an idea for the air crew particularly of what it felt like to have tension come on it wasn't realistic. But it gave you an idea of how the helicopter reacted to all this. It was pretty benign so this went on for a little while and finally the ship was declared ready and the equipment had been loaded on it. Probably be a good time to reiterate what the equipment was. On the ship you had a set of constant tension winches with drums and all the machinery that those involved and by specification they were supposed to be able to go from zero tension to 4,000 pounds tension. Now that included a whole bunch of pulleys and electric cables and complex and complicated system and it was all hydraulic too. On the deck itself you had the Beartrap and it was called that because it was like a leg trap. It was a four foot square about six inches high and inside that square you had a couple of steel bars that were off to the side until the aircraft probe was in it and then these bars were fired and they secured the helicopter to the deck. After that came the fore and aft movement and that was to straighten and centre the beast out and push it into the hangar. That is a very short and simplified description of what the ship system was.

On board the airplane what they put in was another winch system but this time it was used to send a messenger cable down which hooked onto the main cable system which in turn was

hauled up into the airplane and locked into a structure called the main probe. What that did was it locked the main haul down cable to the airplane. There were associated lights and whistles that went with that but basically that's the principle. You wanted to figure out some how to get a fairly large strong cable into the helicopter and put tension on it. So those are the basic systems.

Before we can even consider hooking on and doing any tensioning work or anything else the pilots had to get very familiar around the ship. The whole thing started off with the ship being at anchor in Bedford Basin and the ship was the HMCS ASSINIBOINE which was designated for the trials. Commander Walter Blandy was the commanding officer. There it was sitting in Bedford Basin and we chugged out in our helicopter and proceeded to have a look. First of all it was just straight familiarization just getting used to what the ship looked like from various angles what it's all about really and doing some hovering work too. Trying to figure out where initially the best place to hover, it was all free flying really. From there we went on to the initial hook ups and initial haul downs.

Again I would like to emphasis that the whole process was a step by step process and we tried to take little gulps in what we were doing. Analyzing after each flight sort of exactly where we've been and what happened was there anything unsafe or anything you could see. It was a pretty steady and I would say safety was a paramount aspects so we didn't want to approach this thing right off the bat. For instance the initial limits that we were going to work to was three degrees in pitch and ten degrees in roll of the ship. Within that parameter we would expand the envelop for the relative wind and things like that.

We are now getting to the stage where the pilots are getting quite familiar with the ship and what it looks like and what happens when you get close to it and what we don't like about what is sticking out of the ship. When you consider that this helicopter which is a very big one, heavy and it had very limited clearance in and around the flight deck. For instance your blade clearance from the hangar at best was 17 feet that doesn't take very long to cover in just one lurch so care was indicated. But it was also good familiarization you got to know what to pick up with your eyes and how your landings should look or how the ship should look when you are ready to land. This is where we started the actual haul downs. One of the most interesting parts of the project because we very quickly found out that there are a number of forces working on the helicopter when you put tension on the haul down.

Haul down is a bit of a misnomer because we tried that we came to a steady, steady state hover had the LSO increase the tension in steps and invariably the helicopter went down a few feet then stopped simply because of something called ground effect which increased the lift of the rotor. Very soon we got a different way of doing it but one thing we found was that the cable had a very beneficial centring effect. For instance, suppose you were hovering at 20 feet and you got off the centre line of the ship by about 10 feet, well that meant that the horizontal component of that tension, because of the angle you were off, say 20 degrees which is a cosign, this is getting technical but it doesn't matter. The centring force wanted to haul you back to the centre of the Beartrap every time so it was very beneficial from that aspect because it made life easier for the pilot in keeping the probe in a position where he could put it somewhere into the Beartrap. Four feet square even with help you are trying to put a piece of pipe into a four foot square something like 16 feet behind you it makes for an interesting exercise.

But in any case from that aspect some people would call it a cosign function from that aspect

it was very, very beneficial because it always tended and it was quite noticeable to bring you back if you went off. It went in either a side forward or aft directions so it was always there. Now it also had a destabilizing affect because of the difference of where it is pulling and the centre of gravity of the airplane which tended to tip the airplane one way or the other. But the stability and control of the airplane and the control powers were such that really that this was minor. It was there, you knew it was there and it tended to destabilize things a little once you knew it was there, there was really no problem you could overcome it very, very easily. That's one of the first things we found out about the haul down system.

I will reiterate one that was a little bit of a misnomer because it doesn't haul you down we soon found that the pilot was the input, he landed it, so he had to use the controls to land and at the same time aided by the tension of the Haul Down System. Now you couldn't just thump the thing the deck because you would drive the landing gear right through the sponsons and break the airplane. If you did that Her Majesty would be very mad at you. Again it was approached step by step we just did it gently at first and then finally figured that anywhere between four and six feet per second seemed to be the ideal.

As a little bit more of an explanation of the centring force perhaps if you can imagine it. That force grows as the angle and the length of the cable gets shorter and shorter it is quite noticeable in the airplane. Just as a note it saved an awful lot of landings because people noted that anywhere from four feet above the Beartrap is somebody was two feet outside of it the centring force would snap you back into the area. It was just another little explanation. But okay once we are down comes really the meat of the project in so far as the ship's side of the Navy is concerned. You had to find out how to move and handle a very heavy piece of equipment with protrusions all over it and things like blades flapping around and lord knows what else. How do you move it and put it into the hangar and do this kind of stuff. It was the first time that we tried to move the actual helicopter around the deck. It had been done with dummies before that were built by Ferry Aviation but dummies and actual equipment horses of two different kinds.

The initial moving trials, when you started moving this mass around the deck showed that the concept was good and that it would work and that it would safely. First of all the helicopter is held down there is no way it is going to move because of the Beartrap bars that are holding it by the probe. Secondly, once you could get it to move when you were traversing, then it worked fine the beast followed it's leash and straighten itself out and slid into the hangar like a nice docile animal but of course things don't usually go that well. The initial sea handling trials showed that man we had a problem with the tail and it was a big one. Then found out we had a problem with the tail probe which was used to ensure that the tail stayed in the centre of the flight deck it ran in a groove of the flight deck and that held it there so the airplane could not slice, the tail could not slice off to either side. That produced some interesting talking and head scratching and how do we fix this.

Normal way say well you attach a dolly or a bar to the tail wheel and when the time comes, just brute force. Well yes but if you did that unfortunately the person on the bar was too close to the back end of the ship he fall over and bang his head on the mortars, that wouldn't go. We had to invent a new type of bar to put on the tail wheel to get it started so that it would castor so that the airplane could move. Fine that worked, other problems serviced basically with the hydraulic systems on the winches they could not meet specifications. You had problems like called snatch loads, where all of a sudden if there is any slack in the cable the drum speeds up and goes like hell and then bang it stops. You either have a broken cable or a

cursing pilot saying "What the heck are you trying to do to me." Not unexpected problems because all this equipment was new and it had to be proven and go through the procedures and it had to be changed. Control laws had to be changed and all kinds of technical aspects. From the flying part, this end there were no real problems statically you were just working in an enclosed area. You had masts and radio antenna that definitely had to be moved, and they eventually were.

It was a fairly normal type of operation so we could honestly say that the very initial part of it was quite successful and showed that the possibilities were there and we needed to do a lot of work. The envelope really needed to be expanded to be useful to the navy but all the signs were there. As a little aside on one of those trips from SHEARWATER to the ship in Bedford Basin of course fog. The place was fogged down completely but we had a deadline to meet and all the rest of it so I got permission to fly under the Halifax Bridge, legally. By feeling my way close to the shore until I saw the bridge pylons looming then going under it and then finally breaking out in Bedford Basin which was in bright sunlight. But it was probably the only legal fly under that was done under that bridge in those years.

The testing went on, flying went on, most of it still static and we expanded whenever we could we tried full tension, part tension, a little bit. We explored that whole envelope and again as I indicated there were some problems with the control laws and the system because they were excursions that were unacceptable and broke cables and did things like that. But again that is why the test program is so conservative because you are running into unknown areas in many respects. But in the end it was very successful and I would say this is worthwhile pursuing.

Included in that was demonstrations of course because there was great interest being shown in how this system works. I well remember one demonstration for the Chief of Defence Staff where a whole passel of VIPs and of course the system was broken, so how do we demonstrate it? Well it was fairly simple you station two brawny sailors into the winch compartment with instructions to keep that line taught no matter what happens. So we proceeded and demonstrated with a nice taught line between the ship and the helicopter and landed. Demonstrated a number of times and everybody was duly impressed. But probably the only crew that had been hauled down by two sailors in the history of this thing. We did that quite often for demonstrations especially along side wharfs or jetties because in those days the system had it's problems.

Aside from being hauled down by two sailors the initial part of the investigations and initial flying also included any number of what we call free deck landings in other words you were not attached to the ship in anyway whatsoever. This was done to explore how feasible was this manoeuvre of trying to put a small probe into a four square that's 14 feet behind you. With a lot of practice you got to be quite good at it. That went along with every pilot that flew these helicopters it was quite a stable bird. For a huge helicopter like this it was quite responsive so doing things like that were possible. Again it was just exploratory work.

From here we went on to our first underway trials. Again it was very conservative because we were working with the limits of three degrees of pitch and ten degrees of roll. It was just trying to see what kind of problems you end up with from a pilot's point of view and the ship's point of view. Now the first problem that really reared it's head very, very quickly was reference points. If you as a pilot tried to make your datum or your reference point the ship within two or three oscillations you were in trouble. If you were following the ship invariably

the helicopter and the ship diverged within about two oscillations and then you had to start all over again. It became quite obvious very early on in the trials that some sort of stable horizon indicator was going to be needed. Now in daylight under VFR conditions where you had a horizon it wasn't too bad. You could train yourself, and this had to be done, you had to train yourself to ignore the motion of the ship. You had to fly with reference to the world and the ship could do what ever it wanted under you. You weren't too worried about it but you had to have some sort of a reference otherwise the two pieces of equipment would diverge very, very quickly. That was the major problem from the flying side that we encountered. But carried on and expanded the envelope as much as we could trying to stay within the parameters we were told to. But we expanded the envelope and we began to prove that yes this was a feasible operation.

Now some problems didn't go away for instance on board the deck once you put it on board and secured it and you had to move it. Well the problem with the tail wheel was still there the friction or stiction as they called it was such that the Beartrap was not able to move the helicopter. I should explain that normally after landing the first movement of the helicopter is backwards because that's how you get the helicopter to centre itself not only in the trap but in the flight deck. To do that you need to castor the tail wheel. If you can't castor it you can't move the damn thing. We tried the bar which I mentioned before and that worked. It really wasn't a good solution because you had people flopping around on the deck slipping and sliding, fighting the wind and doing everything else when the deck should be clear. The final solution came you had two constant tension winches mounted on the ship that hooked into the tail wheel so when the LSO started moving the bird then he just put tension on one winch or the other which ever was appropriate and that solved that problem. It worked and it is still working to this day.

These are the types of problems we were running up against. Honing the landing procedures, again once you were underway the ship has six degrees of freedom kind of. The airplane definitely has six degrees of freedom and unless you can get these in sync you've got a real problem and, as I said, the pilot basically even under benign conditions had to ignore what the ship was doing except to keep within the space of the flight deck.

Keeping over the flight deck, you can see the requirement for that. One because when you arrive there you have to drop your probe on your messenger and after you get it hooked up then you have to haul up the wire. Then make sure that it's taught so at least when you are coming in it is very important to stay somewhere over the flight deck where the person underneath you could grab that probe and hook you up to the main Haul Down System. That is sort of one restriction you will always have other than that the operative word is that you start flying the world and let the ship do whatever it wants to do underneath you.

Now during all these early trials and all this early flying we found out a number of things included amongst them was the ideal hover altitude over the ship once you made your approach was about 20 to 25 feet. You could start higher, you shouldn't start any lower because you start losing reference points but somewhere around 20 - 25 feet was ideal. There you could lower the probe, a person could grab it and you could get hooked up and the ship had absolute freedom to do whatever it wanted under you. You had to follow it a little bit but basically you just flying the horizon, flying the world. That seemed to be about the ideal space because you could see forward, you could the hangar top, you could see part of the deck if you looked straight down. Everything was kind of working for you at that height.

Probably a good time to introduce the method of how the landing was accomplished. At sea the ship has got roll, pitch, yaw, heave, but any ship even a small DDH, which is a helicopter carrying destroyer, has periods where everything seems to calm down. Everything just stays quiet and the ship is upright and it is not rolling not yawing it may be pitching a little but there is always that period. It doesn't last long it lasts anywhere between six and eleven seconds so that's the time period you have to land.

The person who can tell best what the ship is doing is the Landing Signals Officer (LSO) and he is the one who initiates the landing and he initiates either by hand signal or via radio, radio most of the time. What happens next is when he says land he raises the tension, for us 2,000 pounds was the ideal, so that is what he raised it to. The pilot then controls his rate of descent with his collective and does his damnest to keep everything coming down at a nice steady rate so that there are no wild excursions and everything ends up with the probe in the Beartrap where the LSO fires the bars that lock the helicopter into the Beartrap. Easy to describe but it can be exciting. But that's the basic idea.

You've got to watch a few things of course. You know you've only got 17 feet of clearance between you and the hangar. You know that if you get excited and drop the helicopter too fast then bad things are going to happen, people get mad at you. It has to be a precise type of manoeuvre, training - can't express it enough - training. training, training, training. It's not a natural thing but it can work and does work and people have been doing it for many, many years now.

Talking about all these landings one always assumes that it's going to be successful. Well, it isn't always so. First of all, on the approach to the ship, probably a few words are appropriate. Start off at a safe altitude, comfortable airspeed, and then just slow down. For myself I like to use the 180 approach, the standard carrier approach, because I was trained that way. We'd start off at about 80 feet and 80 knots and then do continuous curve to the ship until we were about 200 yards off. By that time should be staying at about 80 feet but slowing, slowing, slowing all the time. At the end you want to approach the ship at no more than five knots relative because now you are getting into a tight area. This is basic tight area flying for helicopters, restricted area flying for helicopters. Your speed you want to control so you could come into a hover at the ship at 25 feet or so and somewhere over the flight deck. Now if things weren't going right on the flight deck for any reason whatsoever the ship decided they didn't want to recover you there or something was going wrong with the equipment then what you would do is you would get a wave off from the LSO. You would just go around and try another approach or hover or go and do something else until they were ready to take you back.

On landing once you were hooked up under tension and the landing started and say the LSO misjudged and the ship took on a horrible roll just when you were about 10 feet above the flight deck. Well then he'd give you a verbal wave off. Again it was no real big deal because you just increased the collective, you started climbing again and away you went. Now you were still hooked up so if it was for another approach then you'd have to drop the cable, you have to remember that. But the LSO would let you know. On landing another wave off procedure is if you land and your bottom has not wiggled quite the right way and that probe is not in the Beartrap. Well that's an awkward position for the helicopter and for the ship and for everybody else. If the LSO sees that you are going to miss the Beartrap you get another wave off. You go up and try again. That was always there.

We will assume that after an approach everything went well and you landed and you got a little bit of ships roll say maybe ten degrees, a little bit of pitch and a good wind blowing out there and say you've got about 30 - 35 knots of relative wind over the flight deck. That's fine you come in, you land, everything works fine until you come to folding the blades of your rotor and folding the tail. This is a lengthy procedure, it seems lengthy it only takes about 37 seconds but it's a critical and lengthy procedure in that two things happen the blades start folding and of course you find the wind starts them going. You have to have blade walkers, well very confined space but okay blade walkers worked. A device had to be made so that you put it over the tip of the blade and that the walker could actually control the blade as opposed to being controlled by the blade.

The other thing that happened quite often is the tail rotor when you fold the tail back there is a brake that is supposed to come on that will stop the tail rotor from free wheeling. On more than one occasion we would start tail fold and that rotor just took off. I mean literally took off. There were two cures available to you. One is to make the machinery work properly which finally after a bit of effort it did so that when you folded the tail rotor the brake came on and stayed on. The other was a bit of an emergency procedure where you had to haul the helicopter part way into the hangar get the ship to turn right into wind and then get some nice soft whisk brooms and that's only way we could stop that sucker. You run into unexpected bits and pieces like that.

Continuing on with all these problems I think it's about time we stepped back and had a look at where we were. Problems were expected because you were dealing with new designs new ways of doing things and new pieces of kit. You had to devise procedures to overcome some of these problems and for the most part we did. Some were not solvable except by engineering changes they had to be re evaluated again but all in all I think it could be said that a number of things came out of this portion of the trials any how. Was that we'd proven pretty well that it was a feasible operation that there was nothing to stop you further from going in the development that couldn't be fixed. And that it was worthwhile to carry on and to get to the full envelope of the ship helicopter combination which basically was you had to be able to land on 10 degrees of pitch and 30 degrees of roll which are considerable if you've ever stood on anything that was tilted 30 degrees.

The other thing that came out of this is the requirement for training. This is not a simple procedure nor operation. It's a real team effort so everybody had to be trained, you were working in a confined space with not much room to manoeuvre for either the people on the deck or the helicopter itself. The requirement for training and good briefing debriefing was obvious. Certainly for the pilots there was a number of things that they had to overcome one is the absolute tendency that every pilot that ever tried this procedure he had to follow the ship. Your initial tendency is to do what the ship is doing and that can lead to very, very dangerous consequences. As for the rest we proved that yes it was feasible and that things like the Haul Down System and the centring and positioning system were very much not only desirable but required to make this operation successful.

From here we went on to prove out that the latest fixes and then we had a hiatus for awhile before we started flying again. That's when they widened the hangar, they did some work on the haul down system and probably at that time they put in the dustpan lights on the ship. Also it was very obvious right from the start that we needed a horizon reference right on the ship of some sort. Again you didn't know quite what but we managed to rig up something that gave you an indication of where the horizon was on the back end of the ship. Now basically

what it did was give you a reference point for your bank angle attitude. You are trying to get the ship to give you something to simulate the world's horizon. That was progress it became very obvious very early on that it was mandatory.

We also so put in probably one of the first heads up displays in Canada. Into the helicopter again it was extremely basic and it did have a horizontal reference. It was better than nothing and did help in the subsequent trials.

INTERVIEWER: This is the Joseph Sosnkowski interview this is the end of tape one side two.

This is the Joseph Sosnkowski interview this tape two side one.

SOSNKOWSKI: From here what we wanted to do was to really start expanding the envelope and at least getting to the initial limits which were fairly easy to do because 10 degrees of roll and 3 degrees of pitch is not much in the middle of the Atlantic or even off shore from Halifax. Yes we proved it to at least that now before we could go much further we had to fix most of the problems with the quick securing and handling device including the excursion and tension from the haul down winch which on occasion actually broke, broke the wire.

One other test we did was we were worried that if we released the haul down wire under tension, wanted to see what the helicopter would do and whether the LSO or anybody else on deck were in any danger. Well it proved that you had to do something really stupid before the LSO was in any danger. In other words you had to be hovering way beyond them and have the cable out to almost it's full length and then release it and it probably could have hit him. That was easily fixed because we just never got into that position the LSO wouldn't let you. Secondly, the releases as far the helicopter was concerned well there was just a little bump because you lost some weight and that's all the effect it had. Even under full strain off to one side, it was a real non problem. The thing falling to the deck and being hauled in by it's winch that proved to be a bit of a problem because at times until you could slow things down on the winch. The winch would accelerate, the cable would come flying into the bellmouth of the Beartrap, stop, break and then you had at least a 20 minute problem of re reeving another cable. This was what was going to go on for the next couple of months before we started to go off into the night and into trying to find some heavier weather to see the problems involved in much more severe motion of the ship and of course the night flying.

Almost from the start it was clear that to really be successful and really make use of the envelope of the ship and helicopter combined we had to have some sort of horizontal reference on board the ship, something that would tell your bank angle. Whether you were flying straight and level or whether you were trying to follow the ship so you needed some sort of reference. As I said before, for the next set of trials, we put an eight foot bar on the back of the hangar and stabilized it in roll only so that was only one freedom of motion that we covered. I also had a heads up display in the helicopter itself so that was a help too.

Again I would like to say that under normal circumstances if you had some visibility on the horizon and reasonable weather then it was problematical because of that huge tendency to chase the ship. But you could cope with it, with training and deciding no the ship was not going to drive you, making your own mind up you could cope with it and you could operate. Now it was obvious the heavier the ship's motions got and the worse the weather and visibility the problem would exacerbate it would become pretty, pretty big. The pilot would

start losing all references as to where he was in the world so his side vision would disappear in bad weather and under night. Just harping on this a little bit because it was really critical to the whole operation.

We had this mounted, yes it worked, not very satisfactory but yes it worked, at least it gave me a reference to fly by. We started out by taking it step by step and expanding the flight, wind and motion envelope, it became almost routine. The problems with IFR - Instrument Rules Flying that is with very restricted visibility and ceilings it became fairly obvious to us that there was going to have to be some cure to help the pilot figure out where he is relative the world as opposed to just that thing in front of him.

What we had was very, very minimal but it allowed to us to operate and expand the envelope to a reasonable degree. I can't really remember what we got up to but it was somewhere from 15 to 20 degrees of roll and about 5 degrees of pitch. In some bad weather did some flying in bad weather too that really brought home the problem of a good horizontal reference. There was a pause in the flying and work was being done on the ship helicopter and the rest of it and we started again in December and then that's when we started chasing really bad weather and the night flying.

First few approaches at night flying were done Bedford Basin so that everything was nice and still and even there it was obvious that some means must be devised to give the pilots a good reference. VX10 started working on this so did other people and this was in the bag so to speak after I left the squadron.

The initial night flying was not that much different from the day flying, you were just on instruments a lot more. The approaches were much the same. If the visibility was restricted there was a tendency to forget how quickly you were closing on the ship which resulted in some interesting manoeuvring going on at times - fairly high nose up. As you try and slow down because it's very hard tell relative motion between you and the boat when conditions are not good. But again we managed and much the same problems we encountered during the day flying were there at night. Compounded a little but not really all that much different.

Now when we got into the real heavy weather which of course meant that even in daylight visibility was restricted at night it became even worse. Literally when you were hovering the ship was doing very strange things under you and it was very, very easy to get into a pilot induced oscillation inadvertently. Then you had to physically had to force yourself to stop centralize everything, let the ship move and start over again trying to keep a steady hover over the deck and be in such a position that when the LSO said "Now land" that you could expedite the landing and land safely and quickly. Yes it could be done we had some problems that needed very much to be solved but basically there was no doubt in anybody's mind that yes we could operate off of and on to the ship in just about any condition you could describe except hurricanes of course.

The ship board handling some of the problems there were described there were others again these were fixed eventually and in the end the whole thing came together and proved to the world that yes you could operate a very large helicopter off a very small platform at sea under just about any condition that you could imagine.

I think this is probably all I want to say about this at this time. It certainly was exciting, it was productive, we learned an awful lot and I think it was successful. Thank you.

INTERVIEWER: Thank you very much Joe. I think before we conclude the interview it might be appropriate to ask you if you'd like to make any special comments because you are in a position now to look back 40 years from the time you did this major development work.

SOSNKOWSKI: Thank you. Yes there has been a lot in the papers lately about the new helicopter and all the rest of it and there certainly wasn't that much about the new helicopter which the HS2 was at that time for us. But in all when you think about it after 40 years and hundreds of thousands of flying time, hundreds and hundreds of sorties most of them at sea with this system. I think it's proved the point. We have damaged very few helicopters, and we have never lost one life so I think anybody who had anything to do with this project can take pride in it and say that yes we produced something that was not only successful but operational and did the job it was required to do.

INTERVIEWER: Thank you very much Joe on behalf of the Canadian War Museum I would like to thank you very, very much for this interview that you've conducted this morning. This is the end of tape two side one.

TRANSCRIPT ENDS