ORAL HISTORY INTERVIEW TRANSCRIPT

INTERVIEW CONTROL NUMBER: 11-C37 (B)

INTERVIEWEE: Commander (Ret'd) Joe Cunningham

INTERVIEWER: Sid Jorna

DATE OF INTERVIEW: 9 November 2011

LOCATION OF INTERVIEW: Victoria, BC

TRANSCRIBED BY: Joy Thatcher

NOTE: This transcript is an edited version of the original interview to remove unessential words and vocalizations. Inaccuracies in numbering of equipment have been corrected and placed in [ ] brackets in italics.

Transcription of Interview Number: 11-C37 (B)
Joe Cunningham
9 November 2011
Interviewed By Sid Jorna

NOTE: This transcript is an edited version of the original interview to remove unessential words and vocalizations.

Interview starts (audio file: Interview A)

INTERVIEWER: This is a CANDIB interview with Commander (Ret'd) Joseph Cunningham. Commander Cunningham was involved in various technical things from the period after his sea time period from about June 1966 until his retirement in (let's see retirement) 1986. In that time he has seen many different, many different assignments including being involved with the [*AN-SQS 507*] variable depth sonar for the FHE 400 Hydrofoil and in CFTSD positions and Davie Shipbuilding etc. on the *ALGONQUIN* Class ships. Later on he was involved with Paramax and so we would like to explore this period and talk more about his involvement with these programs. Now at this point I would like to ask Mr. Cunningham to identify himself and to, and to acknowledge that we have both signed the Oral History release forms.

CUNNINGHAM: My name is Joe Cunningham. I've provided a short history in print and I have signed the release form.

INTERVIEWER: Okay thank you very much. Okay Joe could you outline very briefly the major involvements that you had from the time in Westinghouse in 1966 until you retired.

CUNNINGHAM: I was sent to Westinghouse because they had been the supplier for auxiliary machinery for the *SAINT LAURENT* Class and my job essentially was to close out the plans and the spare parts on the and the refurbished bits and pieces and return them to the supply system and that wasn't a very complicated job so I also got involved in, for the first time they began to repair turbo blowers which had been the bane of our existence in the *SAINT LAURENT* Class and I was required under those circumstances to inspect the cutting down of the worn areas of the turbo lower shafts, nickel plating and then chrome plating to build them back up again and put them back in service. So I was also involved and that was perhaps the first time we'd ever done that sort of thing so that was an eye opener for me. I also was the resident Naval overseer for a number of subsidiary plants around the area one of which was Babcock, Wilcox [in Guelph] and there I learned; a very difficult job. I was taken in by their X-ray examination of main stop valve castings. Eventually I discovered that they were not using [a strong enough radiation source] thus the X-rays weren't [discovering the faults]. What I was seeing in the X-rays was less than was available. So when I went to the dockyard subsequent, in fact on AN/SQS 503 trials, I talked to the people in the dockyard and they said these stop valves you're sending down here are failing on us so I learned very quickly how to ensure that X-rays and castings and so on were properly accomplished and at the same time Fort Erie was on my list of things to do and Fort Erie was in

the process of building [*AN/SQS 505*] hoist for the *TERRA NOVA* [which] was the trial ship that I was on. So eventually we produced enough to fit all of the R*ESTIGOUCHE* Class, but I wasn't there for every one of them. I was there for the prototype and I had the job of managing the design on behalf of Ottawa for most of the time.

INTERVIEWER: Now the, when you mention Fort Erie are you talking about a company?

CUNNINGHAM: Yes Fleet Manufacturing in Fort Erie.

INTERVIEWER: Yes they made the handling gear for the large VDS later.

CUNNINGHAM: That was the one that I was basically involved in. I started the design for that and in the second year we started the design for the Hydrofoil and we completed it, but unfortunately the Hydrofoil [was cancelled and so] didn't complete so we never fitted it.

INTERVIEWER: Right and this was the handling gear that you were involved with?

CUNNINGHAM: Yes so the handling gear was, in fact I was involved in the body as well but that's only because the body or the body so the people in Ottawa were a little less than forthcoming in a lot of places.

INTERVIEWER: Yes, did you have any involvement with Hank Baker during that time?

CUNNINGHAM: Not really, I knew Hank but [not well]

INTERVIEWER: Because he was the guy in DMCS 3 and Director of Maritime Combat Systems for sonar that was involved with the….

CUNNINGHAM: No I was dealing with some of his minions, who were,

INTERVIEWER: Howard Boucher and Len [Roberts],

CUNNINGHAM: Len. I found him lying, a couple of times which isn't very nice. In any event I had to get involved in that because that wasn't going well but I wasn't really involved in the design of that other than to ensure that that body fitted to the saddle and so [on].

INTERVIEWER: Fitted to the saddle yes, well I know that there were a lot of strain gauge trials done … the boom bobbing system.

CUNNINGHAM: Yes I did all that good stuff [I was deeply involved with the boom bobbing system]. I went up in to the Dockyard got myself a dynamometer and heaved on a steel wire rope to see whether it would push down and stay down. Dynamometer didn't work so I snapped the cable. So I then had to go off and ensure that the dynamometer was appropriately calibrated before I did the next test.

INTERVIEWER: Right at this time, just for your information, I was actually a junior officer on *TERRA NOVA* helping the ship do the various towing trials. The *DIANA* system I guess is what they called it *[DIANA was the name given to the AN/SQS 505 sonar whilst it was under development]*.

CUNNINGHAM: Yes, yes. I went to sea with her and there were strain gauge trials; we did cable tension trials. I had a fair interaction with Naval Engineering Test Establishment when we were fitting the gauges and so on, and reading them out and that sort of thing. Yes, and so I used to produce all the reports on the sea trials back to Joe Meban in Ottawa [DMES-5]. He was somehow involved; it was hydraulics basically and he did the AOR design for the lifting of the Kingpost. So we had [a bad system], we also started out with Vickers hydraulics and shifted to Dowty hydraulics because Vickers failed badly. So I began to learn a good deal about hydraulics and hydraulic design.

INTERVIEWER: Yes, now on the ship trials on *TERRA NOVA* there was a Polish fellow from NRC I think he was was helping with that. Do you have any recollection of that at all?

CUNNINGHAM: There were two engineers in fleet, one was Hungarian and one was German but, Mr. Kemeny was the guy from Fleet. He was Hungarian.

INTERVIEWER: So how did you find Fleet industry were they a good company to work with?

INTERVIEWER: They were reasonable.

INTERVIEWER: Responsive?

CUNNINGHAM: I thought that they were flying a bit high. They were required to produce a production plan and I eventually shut them down because their production plan that they suggested that they had completed their milestone when they finished half of the drawings. Well the half of the drawings they were supposed to complete were the design drawings and what they had done is completed a lot of the as-fitted drawings, which weren't design drawings and they were late. And what we wanted of course was the design drawings and the ability to criticize the design and they were looking for a progress payment for half of the drawings finished. I said no, no. So we cut their progress payment and right after that [Judy LaMarsh –Liberal Government] came down and gave them an industrial grant equal to the amount that the progress payment would have cut.

INTERVIEWER: Yes politics intrudes right?

CUNNINGHAM: Oh yes but it's still a learning curve. That was a learning curve for me.

INTERVIEWER: But actually that hoisting gear design and implementation for whatever the teething problems turned out to be quite successful. It went on the IREs, it went on the

IROQUOIS Class and it's still operating on *ALGONQUIN*. I was out to sea with her recently and still going. There were a couple of, now I shouldn't say failures but it took us a long while to get the cables correct. We lost how many bodies did we lose in the trials? About three or four I think.

INTERVIEWER: Oh on *TERRA NOVA* much more than that; at least fifteen if I recall. They went in to making the concrete ones because they were losing too many. In the towing trials trying to find the envelope for towing, Max Reid was the Captain of *TERRA NOVA* and he lost quite a few that way.

CUNNINGHAM: Okay that was a little ahead of my time because Nigel Brodeur was the [CO] in *TERRA NOVA*. I was there with Max Reid, [as the Design Authority] for a while, but he turned over to Nigel Brodeur.

INTERVIEWER: Yes that would have been 1969, 1970 kind of time frame.

CUNNINGHAM: So that was good luck and at the same time I picked up on hydraulics for the Helo Hauldown program because that's where we got the Dowty [Electronics] you know. Essentially what they did is they compared the Helo Hauldown program to the VDS hoist. Said you know here's how we did it in the Helo Hauldown, why don't we do it that way in the VDS hoist?

INTERVIEWER: Right, now the Helo Hauldown was trialed sometime before that in *BUCKINGHAM* and ships like that. So did this lead to a new design?

CUNNINGHAM: No, no well this Hauldown experience was what gave me the confidence because it was successful in the Hauldown I said it's going to be successful in the hoist and therefore we moved from Vickers which wasn't producing. Vickers had a thing called a PVD 90 pump which was a plate against which the pistons were sprung loaded in a sort of like a Coke machine and eventually I lost my steering in *ATHABASCAN* on sea trials because of the same goddamn pump and the same failure. When you get a back pressure on it the Coke machine and the plate separates [and then] you have no pressure. And you know things can still…that's what happened to me on the sea trials for *ATHABASCAN*. And largely what had happened in the hoist it separated but it had only separated for brief periods. [In the 280 design] Sort of bounce on from that and then come back and [when it happened we were doing full astern trials and] the rudder swung hard over [and] wouldn't come back. [Then we] went around in circles. So the Helo Hauldown design actually influenced the VDS [design and the DDH 280 steering gear] through Dowty and through Joe Meban as well because he had been involved in the Helo Hauldown program himself. And I don't know whether it was Dowty or not who did the AOR design but any rate I wasn't involved in that - essentially they're both constant tension [in the line by producing constant pressure in the hydraulics] designs.

INTERVIEWER: We talked about the handling gear design mostly out of Fleet Industries and some of these other connections, how did Westinghouse fit in with this at all?

CUNNINGHAM: No not at all.

INTERVIEWER: That had nothing to do with Westinghouse?

CUNNINGHAM: No nothing I was based in Westinghouse. The office was there and if I had jobs to go to … in other words I was [on the staff of] the resident Naval Overseer in Hamilton [Cdr. Grosskurth] for which I was then responsible for casting of propellers up on the Lakes in Collingwood. Interesting but you know I already knew what a propeller looked like, but you know you learn, you learn. I knew about casting from Manadon [RN Engineering College] before so that wasn't a problem, but it was interesting to see that all of the theories you know actually working in place.

Aside from that I had that I had Babcock & Wilcox, I had an electrical company for electrical motors (forgotten the name of that one) Robins and Myers. There was an electrical motor company that I used to oversee and release their products. We ordered them; somebody had to go down there and release the products. So I had all of these jobs on the outside and Hamilton. They were just in the Hamilton area and Fleet manufacturing was another one in the area - they were in Fort Erie, Ontario.

INTERVIEWER: Okay. So you had quite a territory.

CUNNINGHAM: Oh yes.

INTERVIEWER: There's a lot of industry in that little area.

CUNNINGHAM: I shouldn't say I tried to get into the General Electric plant in Toronto but I was the overseer for that was Saint John Shipbuilding and they cut me out. That really annoyed me because I wanted to learn how the AORs were being built and they said don't let that guy go anywhere near the stuff you're supplying for us. That was my first occasion to come across K.C. Irving and his boys.

INTERVIEWER: Yes well it's very interesting that I interviewed Bill McRitchie. I don't know if you remember Bill?

CUNNINGHAM: Oh yes.

INTERVIEWER: And he was, I think, the PNO. I'm not sure of the distinction in the building of the AOR and he said that one of the issues they had to face was a disagreement about the standard that the ship was to be built to, whether it was Lloyd's standard or whether it was a Naval standard and that this was a constant struggle with Saint John Shipyard.

CUNNINGHAM: Yes and I got faced with the same problem. I was denied access to the plant, which was strange for me because usually manufacturers like to know how their equipment is

eventually going to be used. And all the way through my career I had spent a good deal of time telling civilian manufacturers what the Navy was all about and how a naval ship worked and therefore how this was going to, you know, and how maintainers worked, and therefore how this was going to work. And you should try and build it this way because it isn't like it's going to have lots of watchkeepers; not just set it and forget it. So any rate they usually welcomed me but I was quite surprised when these people said no go away.

INTERVIEWER: Yes. So this period of your career would have wound up in about 1968?

CUNNINGHAM: Yes, and then I was off to…, I told my career manager that my kids were still just a couple of years to go before school, now would be a good time to send me to a foreign or an isolated posting. They sent me to Quebec.

INTERVIEWER: That says a lot doesn't it?

CUNNINGHAM: Yah but in any event I suspect that I was chosen for it because of the involvement in the *[AN/SQS 505]* design.

INTERVIEWER: Do you know what happened, just going back to the Hydrofoil handling gear, did they actually finish that design?

CUNNINGHAM: Yes it was finished, the shore trials were done. We could have shipped it and you know it would have worked on the Hydrofoil. I don't know whether in terms of towing I don't know whether it would work.

INTERVIEWER: Yes they never actually fitted it to the Hydrofoil?

CUNNINGHAM: No, no, we never and of course they would have had to come down off the foils in order to use it. They would never tow it full speed.

INTERVIEWER: Were there fairings involved like were in [the other ones]

CUNNINGHAM: Oh yes it was virtually the same cable. It was quite a bit smaller, but just a mirror image and reduced in size. Fathom I think was the one that was doing the cable so they probably manufactured the cable. I remember seeing the cable and I don't ever remember seeing it built so Fathom must have set it in.

INTERVIEWER: Fathom yes, I remember going through all kinds of issues with Hank Baker and Lenny and those guys about Fleet and Fathom and their relative goodness or badness.

CUNNINGHAM: Now Fleet I found to be reasonable engineers, but not very well organized and yet they would eventually get organized and get it done.

INTERVIEWER: Yes, yes. Do you know whatever happened to the company, did they carry on or mutate into something else?

CUNNINGHAM: Their main job had always been building aircraft wings and I don't know if they ever stopped or not but in any event I don't think they carried on with that kind of hydraulics. They still carried on with wings for a long, long time. I don't know in the end whether…, I think they're still there but they've probably been bought up by somebody else and they're still doing much the same job. They produced wings and ailerons and things for the Challenger.

Of course their main job was in de Havilland or the main end producer was de Havilland and I don't think they got into Bombardier, I wasn't around, I wasn't involved in that part.

INTERVIEWER: Well Bombardier is pretty well taken over in that part of…

CUNNINGHAM: So Bombardier took over de Havilland and I imagine that's where the changes took place. But any rate Fleet manufacturing had always been an aircraft company and they were simply involved in this because they could.

INTERVIEWER: Right, yes, and they did a fair job of it from the looks of things.

CUNNINGHAM: Yes.

INTERVIEWER: Yes. Okay the next phase in your career started about 1968 and we started to get involved with the DDH 280. Can you just outline your role with the DDH 280, any issues that you see there?

CUNNINGHAM: I was the Engineer Overseer. We had an Electrical Overseer, the 2 I/C of the detachment was a Naval Architect and let's see who else did we have? We had a weapons… did we have a Weapons Overseer? No I don't, those were all Chiefs and Petty Officers I think. So in any event I had the responsibility of weapons installation in the 280s although I had nothing to do with the design thereof. They were produced by others and delivered. And the engines; first time we had gas turbines. FT4 was a marvellous engine that's still running; FT12 was a disaster. No not a disaster, but it never kept up the power.

INTERVIEWER: Right do you have any insight as to why that is?

CUNNINGHAM: I guess it was simply over rated; I'm talking about technically over rated. It was said to be able to produce enough power to run the ship at some 18, 16 knots, 16 to 18 knots. It was running at its max exhaust gas temperature at about 16 knots and gas turbines don't like running at max.

INTERVIEWER: Right okay now the FT12 was for the CPF was it or?

CUNNINGHAM: No the FT12s were replaced by an Allison in the 280s and the CPF went on with General Electric LM 2500s.

INTERVIEWER: So they had the FT4s in the earlier 280s and then they switched them out to FD 12s [Allison]

CUNNINGHAM: Yes, yes absolutely.

INTERVIEWER: and it was not a good thing?

CUNNINGHAM: Yes. We went down to Pratt and Whitney in Hartford to disassemble one [FT4] and put it back together again and then run that engine - we put back together on the test bed to see that it worked and we had [not]left a bolt out.

To go back a bit to Fort Erie, that was when I first got involved with DSS in terms of contracts and so on. The guy that I had with me at that time was called Fred Curbishley who was an excellent field guy. He was an excellent field representative for then it wasn't DSS then it was something else prior to that. *[In the 1960's, contracting was carried out by DDP (Department of Defence Production). This later morphed into DSS (Department of Supply and Services) and still later into Public Works and Government Services Canada.]*

But any rate you know they were the guys who paid the bill for DND and unfortunately all of their Ottawa contract managers had totally different incentive in mind in terms of they always kept trying to keep out of trouble as opposed to get on with the job. And they became the guys who wrote the contracts were really annoying because they would strap us into a bind that was very difficult to get out of. And it wasn't providing financial control, it was keeping them from getting in trouble. And their field officers recognized it and we talked about it but there was very little they could do about it.

INTERVIEWER: Right. Can you give a concrete example of the kind of thing they would bind you in to?

CUNNINGHAM: Oh they would give the manufacturer more latitude than he was capable of handling and left me without control. Then they would insist on the product being delivered but they had not written in a delivery standard that I could nail. So they would often leave the contract wide open and be cooperative with the builder and yet then that would just emasculate me as a manager.

INTERVIEWER: Right so the regulation part was very weak, there was nothing,

CUNNINGHAM: Yes. You could see them doing it intentionally and that's what I talked to the field officers about and they said yes but you know that the manufacturers have representatives in Parliament and they'll come down on DSS. Well tough. And that you know that's the sense… because when I was in Davie the *BONAVENTURE* thing had just blown through. That's exactly

what had happened there. DSS had set standards and said, “Thou shall not have extra work in any compartment unless it’s related to a piece of work already there”; so we painted a cabin because it needed painting after being run through a refit cycle and we based it on the existing thing which was a medical locker. And the press got a hold of it, not only the politicians, got a hold of that and the press got a hold of it and the medicine chest became… It looked terrible but Davie looked awful for it but it was DSS who did it.

INTERVIEWER: Yes what was the state of the specific technical specification for the DDH 280s?

CUNNINGHAM: The technical specifications were good; a lot of them were out of date. I had a whole library of ASTM specs behind my desk. Whenever I found our standard specifications going astray and they went badly astray in things; like plastic piping for pre-wetting - the Naval standards for plastic piping were ancient, unproduceable, they were just out of date. And you couldn’t buy this stuff.

INTERVIEWER: Right so how would you deal with that?

CUNNINGHAM: I went to the ASTM specs and chose the ASTM spec that was most appropriate and told Ottawa that this is what I was doing and they agreed. The management was quite capable of altering the design you know. The DDH 280 management was quite capable. The Naval Headquarters design team was somewhat more inflexible but they weren’t in charge of the production so that any time I wanted to get something done it was reasonably easy to get Jock [Allan] and his boys to say yes okay that’s a reasonable solution. Of course I had to convince my own boss that that was a reasonable solution before I said that and that was particularly difficult.

INTERVIEWER: Now I’ve heard tell that the DDH 280 program there were a lot of field changes made in that program.

CUNNINGHAM: A whole host yes. There were two things going on. One is that we were committed to build four ships for 258 million [dollars]. As a consequence we had to cut out things that were going to cost us too much which led us to and I should never have started it. Every time I saw something in the main specification that was being deleted I kept a record of it and I wrote the CF 1148 which everybody else copied for their ship and then we tried to fix it in the PSE 280 phase which was about four years after we delivered. What an ugly mess that was. However I was perhaps the author of all of…, essentially what I was trying to do was bring us back to the original design and every time we said no we’re going to cut that for cost I would say well here’s something wrong with the design. I was in Davie Shipbuilding and Davie Shipbuilding was the follow yard so when I got there in ’68 we didn’t really start building until about late in 1969.

So they needed some help in NCDO Montreal so I went down to NCDO and did the engineering criticism of the design if you like. It’s hardly criticism but you know, review the drawings and

what we had were the line schematics which we had to reproduce into full ship drawings so that they could bend pipes and that sort of thing. Of course when you come from one design requirement into the full thing there are mistakes made. I didn't feel that there were all that serious but you had to go through it in detail to make sure that "Oh well here…goes, and it goes up there and there's a valve there and that's the right valve is it? Mmm, Oh wait a minute "You haven't done that, you know."

So you go back to the head office or the head honcho in NCDO and he goes to his drawing and they get it corrected. I guess I was reasonably good at detail so I kept on haring away at that. But anyway what that did was give me a detailed help concept of the design because I'd gone through it. So when it came to writing up the CF1148 the defect list dead easy for me except that I probably never've done it.

INTERVIEWER: Right. CF1148 is a defect list right?

CUNNINGHAM: Yes that's the….

INTERVIEWER: And that would have been your responsibility to compile?

CUNNINGHAM: It was, it was the responsibility of everybody, every engineer [was required to contribute to the 1148] but unfortunately …we would have meetings I'd lay mine out on the table and people would say "oh oh oh" so eventually essentially I did most of the… I [began to recognize my items, even my typeface in the Xerox of their lists].

INTERVIEWER: Right, right. Now did Davie Shipbuilding do all four of the DDH 280s

CUNNINGHAM: No just two, *ATHABASCAN* and *ALGONQUIN*. Sorel did *IROQUOIS* and *HURON*. In terms of the design we had decided that we would not do an in house design, you know an RCN design, we'd get the shipbuilder to design it. And the shipbuilder said oh, we're much better at designing than you guys are and so we and DSS listened to all of this and thought it was going to be cheaper; gave them the design and then did nothing at all to enforce their ability to criticize the design. In other words the job I was doing in NCDO was one that Sorel should have done and I know damn well that I was there and they did nothing.

INTERVIEWER: They did nothing. So just let me get this straight, the fundamental design for the DDH 280 was done by the shipbuilding companies not by the central drawing office in DND?

CUNNINGHAM: It was actually done by the central drawing office. It was supposed to have been done, no, that's right no, it was done by DND, reviewed by Sorel to ensure its ability,

INTERVIEWER: do-ability?

CUNNINGHAM: Yes and so they and essentially then they would be responsible for the design as opposed to DND.

INTERVIEWER: Okay so the whole idea was to have a feedback loop and a shift of responsibility.

CUNNINGHAM: Yes they took the responsibility but they didn't do any work and there was no way we could get them to do the work.

INTERVIEWER: Right, so how, how did you feel about Davie Shipbuilding as a yard?

CUNNINGHAM: Davie Shipbuilding was great. They had some pretty some excellent new machinery and some pretty ancient machinery. When they lifted in the raft in the gear boxes both cranes were used to lift it in and their emergency lights [bells] were going whang, whang, [lights were flashing]. However they got it in and it didn't fault so ….

INTERVIEWER: So were they on a learning curve with this or did they…

CUNNINGHAM: No, no it was just ancient machinery and they were coming into a shipbuilding mode which was getting new.

INTERVIEWER: They were modernizing.

CUNNINGHAM: They… everyone says it's a brand new thing now not compartmentalization but you're building ships in sections and they knew how to do it. They just didn't have all the equipment by now to do it. They had standard things that CPF designers said oh this is brand new and Davie back then had the Kamag hydraulic lift vehicles. It's an eighteen, I don't know how many wheels it has, a whole bunch of wheels and you drive under a staging, that has a section of the ship on it. You jack up the stage. You jack up the platform and then wheel it away. That it's was designed by Kamag I think of… European anyway. It's either Norwegian or it's, northern Europe anyway.

INTERVIEWER: Right and it transporting large sections of the ship.

CUNNINGHAM: Yes.

INTERVIEWER: So what did Davie build before the DDH 280?

CUNNINGHAM: They had a whole host of …. shipbuilding…. So they're experienced. I don't know if they ever built the *SAINT LAURENT* Class because Burrard had that. I was out here then so I don't know but, I know Vickers built a number of them. Did Davie build any of them? Probably did.

INTERVIEWER: Do you think that Davie evolved their technology at all or their capability all through the DDH 280 program?

CUNNINGHAM: No they evolved their technology through the DDH 280 program. Any shipyard cannot rely on DND work because ours is too infrequent. They've got to have a commercial base and Davie Shipbuilding had Canada Steamship Lines as a commercial base and they didn't have any problem keeping up with technology, with shipbuilding technology I mean. They had no difficulty with that other than they needed capitalization in order to get new equipment. So a lot of their old shops and so on were kind of ancient, but they were still producing things reasonably well.

INTERVIEWER: Okay so is there anything in particular that you'd like to highlight in your experience with Davie Shipbuilding and the DDH 280?

CUNNINGHAM: Well I talked about losing the steering gear on the…, So again, to a large extent I guess I was the one who drove the change from the PVB 90 Vickers pump back to Dowty again and that occurred on all four of them. I got stuck by a guy called a guy called Nicholson in NDHQ who was the gearing [Design Authority]. What do you call them? OPI or whatever. He came out of DMCS [DMEE] the auxiliary machinery …[section] So any way, Nicholson was supposed to produce a shaft alignment scheme, if you like. He came down to Davie and looked at the way the shafts were being aligned and said the ship is moving too much. [He said] I can't give you offsets. You know what the offsets really mean? When you put in a shaft if it were unsupported along its way it would droop. Okay so now you have to bring that back up into, not level but into something near level so that each bearing has the same weight. But then you get to the stern tube and the A-bracket and you can't… On the other bearings you can jack it up and down and measure it and see that they have the same weight. You can't do that out there so you have to set off those in the same easy curve if you like and he wouldn't provide the figures to offset a full straight line. We were getting on and there are a number of phases you go through in building a ship. First of all it's built on the ways; it has its engines in, but it doesn't have its weapons on, it doesn't have rooms and compartments finished…and so on. So you launch the thing then you bring it alongside for outfitting and then you begin putting in furniture, lockers and it begins to get heavy at that point. Then you bring it in again and you begin fitting things like sonar domes and propellers and shafting and so on and we were in the second [docking], you know, and you can't stay in dock forever. It's expensive to stay in dock. So we were getting at the end of this docking period and he wasn't producing any offsets and we had to rely on the bloody shafts and put them in. So I was just distraught with this guy. He'd come down and he'd say "well" and Davie Shipbuilding would say look this is the way the ship works. It does move like this. And the guy would say you need to produce better figures. This was Don Nicholson and they said well we can't produce better figures. So he would go away and say that was a good meeting, I said what!! So I reported it back to Jock Allen and said look this is ridiculous. He said well what do you want to do? And you know "stupid" said, "well I'll do it myself" and I did and it worked out fine.

INTERVIEWER: You mention Jock Allen, what position would he be in?

CUNNINGHAM: Oh he was the guy who was in charge, he was the Commodore in charge of the DDH 280 building.

INTERVIEWER: Okay was he the Program Manager there?

CUNNINGHAM: Yes, Program Manager that's right. You know what else went on? Lots. Many things went on in that building program and again DSS would come down for their meetings and they would natter away, but that's where I began to learn the negotiating process, it really became fun.

Yes, prior to that I'd been annoyed by the negotiation and so on. They had a Scotsman I've forgotten his name as a negotiator and we could almost predict exactly what he was going to say so before the meeting we'd come up with some kind of an answer that wouldn't kill him, but it would at least ameliorate down the problem. So that got to be… we had our in house meeting and the only thing, attempting to predict what was to go on and we'd laugh about it you know, because we'd sit down with him later when everything was finished and we'd laugh about the same things again. So you know, it was a serious negotiation but he was just trying to do the best for the company.

INTERVIEWER: He wanted to remain professional about it.

CUNNINGHAM: Yes, yes and we were just as professional but you know we were learning and he of course had been doing this for ages and ages. It was good fun.

INTERVIEWER: Right, well it was definitely a very successful program I mean those ships turned out to…

CUNNINGHAM: I was happy to see the Helicopter Hauldown go in because I knew something about that from before. I was happy to see the VDS go in and then I was delighted that we were using gas turbines because it had always been my… We had real problems subsequently with Solar gas turbines, but that's another story. That's an operating story as opposed to a building story.

You know most of it is reasonably standard stuff.

INTERVIEWER: Did you get involved with taking delivery of the weapons and having them fitted in the DDH 280?

CUNNINGHAM: Yes, well not so much accepting. The delivery was managed by someone else. When I had been in Westinghouse, at the factory door they accepted the weapons. It was then delivered as a package and as the weapons went on all I had to do was make sure that it fit. They would come down; they would build the base for it, the gun ring or whatever. I'd just have to check that the gun ring was flat. That was interesting. I had to check the base for every piece

of machinery that went on the ship. All of the pumps and so on and I got used to setting resilient mounts and making sure that the bolts were on the right end so they wouldn't come hard up. So yes the flatness and so on the building ways were … and all of that was done on [sloped] building ways so that they had, your level had to be set at three degrees off, [Chuckle]. Oh isn't that isn't that interesting? Got involved in welding and quality of welds and that sort of thing.

INTERVIEWER: Right. Did you find that the weapons fitted fairly easily like was the design and the basic construction well done so that there weren't too many issues in alignment and fitment?

CUNNINGHAM: Most of them did. The Sea Sparrow didn't fit well. There were a lot of glitches with that. The five inch OTO Melara fit well, but never operated.

INTERVIEWER: Oh, because?

CUNNINGHAM: [Chuckle] The silence, the silence you have just heard is the OTO Melara firing. I don't know what was wrong with the basic design of that but it never really succeeded in doing well. They removed it and put on the same gun as the CPF I think [*this statement is incorrect. During TRUMP it was actually replaced by an OTO Melara 76/62 mm*.] It wasn't five inch, they put in a three point something or other, I think - it's about three and a half inches. But any way the OTO Melara never worked properly. *[The Oto Melara 5" 54 (aka 127mm) as originally fitted in the DDH 280's was operated at less than the specified maximum rounds per minute to avoid jams in the ammunition feed system]*

The other thing that didn't really work well was the bunny rabbit ears.

INTERVIEWER: Oh, the stacks [funnels]?

CUNNINGHAM: Yes, it was beautiful but they were intended to keep the funnel gases off the flight deck. Well unfortunately they forgot that when you land a helicopter you put the wind over there [at red/green 45]. In sit[u] now the ship goes this way the winds go and it comes across. Because of the hangar you want the wind coming off the bow somewhere. So that it sweeps the deck as opposed to tumbles; if you head straight into the winds it's going to tumble over the hangar. Well now you're now you're funnel is out in… not very nice. It was intended to keep the exhaust gases off the flight deck. It did that if you are going straight into the wind, but you never did that because of the helicopter.

The other problem with it was that that funnel design was that it opened itself up to IR signature and weapons were coming in which sought out IR signatures and that was not very good. That's why they brought it back up and put a cooling thing.. and that was the Tribal Update…

INTERVIEWER: Yes TRUMP program.

CUNNINGHAM: Yes. I wanted to go to sea in *ATHABASCAN* because I'd already been there for four years and they said no, you're too bloody valuable so you've got to stay for *ALGONQUIN*. It annoyed me, but you know it was reasonable. I just didn't want to stay there for any longer. I'd already been through this lot.

INTERVIEWER: Right. So you saw *ALGONQUIN* right through to commissioning?

CUNNINGHAM: We started commissioning and subsequently I sailed her as her Engineer. This is the first time that we had put engines on a raft and so the rafts had to be built, engines installed on top of the raft and then the raft and the engines aligned to the gear box and then the gear box fitted to the propeller and so on and away we went. It's also the first time that I can remember we used a variable pitch propeller which was good news in terms of manoeuvrability but it was not such good news in terms of operating capability. I also learned that propellers are not designed for zero pitch. They're designed for zero geometric pitch so when we designed the control system to go to zero knots we weren't going at zero knots. We were in fact going about three knots ahead and that got one of the captains into a very difficult [situation]… We [the ship] were supposed to be towed by another *SAINT LAURENT* Class. I didn't shut down the machinery, I didn't want to do that, so we kept the shaft rotating at what was supposed to be zero pitch and at three knots you really can't tell you're moving but indeed you were moving. And he [the other CO] couldn't come alongside well enough to pass the tow because we kept moving ahead and eventually I discovered that this was our problem and not his but by that time he had already, I shouldn't say, failed his… but he got a black mark for not being able to pick up the tow. I'd only discovered that we were going ahead at three knots somewhat, two to three weeks later.

INTERVIEWER: So what is the difference between a zero?

CUNNINGHAM: Well they had never done a basin trial on a propeller that big and so they didn't know where zero pitch was. So they did a geometric scaling if you like and said that's the zero point of the thrust but in fact it wasn't and you were rotating at 80 revs a minute.

INTERVIEWER: So after that the captains knew how to compensate for that?

CUNNINGHAM: No well, yes the captains of the 280's knew how to compensate, the engineer did, he initially he just set the propeller at three degrees astern and then your ship is stopped.

The really nice thing about the 280's was that you didn't have to stay there overnight and you know for a flash up routine and came in and turned the key and away you went. Actually not quite true, you had to warm up the lube oil. If you tried to turn the switch and the lube oil was cold you couldn't get anywhere near full power because there wasn't enough flow to the gearbox and so each of the bearings would tend to overheat a little if you tried to push it too hard. That wasn't a good idea so we always had, essentially always had a separator going to keep the oil circulating and a heater in the oil sump that kept the oil warm.

And that wasn't difficult but the engineer didn't have to be there overnight in order to do that. Although in one case I should have been because I don't know if you know what an oil separator looks like, but it's a watered down centrifuge with a water dam on it. Young ordinary seaman in *ALGONQUIN* set it up one night, the night before we were to sail and pumped all of my lube oil into the bilge. I didn't discover that until of course I turned the key and we started getting alarms that said you have no lube oil, so we had to get a few dozen barrels of oil onboard. We delayed sailing by about three to four hours while we reloaded the gear box and then we had to get rid of all that bloody oil on the bilge.

INTERVIEWER: Yes so there's somebody that you would have liked to have tossed overboard?

CUNNINGHAM: The guy I would have liked to toss overboard was the petty officer who supervised the kid but I couldn't blame the kid for it.

INTERVIEWER: So in the next phase you mention that you went on to the liaison staff in Washington and from there you were able to glean design points that you could feed back into the CPF design system. Would you like to talk about that?

CUNNINGHAM: I'm not sure how much of that, as we were building the 280s I knew that the shore testing of the main engines had been done in a plant in, oh, Philadelphia I think, and so they were just packing that up as I arrived. I had already learned as much as I needed to know but it was interesting to see that they were now running the LN 2500 in the same plant. And the LN 2500 of course was the one that we were eventually going to choose and so I had a pretty fair idea of what the shore test establishment was going to do with it. Interesting there is that we could not, or we did not sign on to the USN LN 2500 which powers their Spruance Class and their FFG 7. There what they do is they develop an engine with the parent company and then they sign on for changes and the changes keep carrying on and on and the engine keeps getting improved. For military design the LM 2500 of course is an aircraft engine and it needed probably a fair bit of alteration from a marine gas turbine. We must have chosen the LM 2500 after, certainly after the Spruance had its influence on it and therefore had some changes, but we did not sign onto the constant ability to change the engine throughout its life like the USN did. So, we would get to a point where the spares for the LN 2500 for the USN would not fit the Canadian Navy and that was unfortunate in fact for operability; fortunate for us in terms of saving money. Again probably another - because the USN had pots of money and they would allow changes to be made which were only desirable as opposed to necessary, so tying into their modification program may not have been a good idea; but I think we should have tied into a phased alteration. In other words we should have probably changed and I hope maybe we will do that with the CPF when they come to do their mid- life refit which they're doing now. I would hope we get we can change up the LN 2500 completely, return the current engines to the General Electric and get the new ones, the new altered ones, but I don't know whether they're going to do that or not. That may be very expensive.

INTERVIEWER: Yes, but as part of that strategy to not buy in to the constant upgrades, did we buy enough spares to keep us going for a while?

CUNNINGHAM: Well apparently I don't know. I haven't looked at the operation. We didn't do well with the diesel design in CPF but then I'd never agreed with that anyway.

INTERVIEWER: So what was the issue there?

CUNNINGHAM: Noisy. Gas turbines are essentially high frequency and the high frequencies quickly attenuated by resilient mounts and things. The great low frequency thump, thump, thump, thump is easily detected by submarines. Mind you the submarines say they can detect the 280s and they can tell one apart from the other based on gearbox noise so I am whistling Dixie.

INTERVIEWER: Well you're not really because there was a big push on acoustic silence in the design of the CPF.

CUNNINGHAM: They use the diesel engines almost all the time. [chuckle] Any rate it wouldn't have been difficult to find another two gas turbines as opposed to, or three gas turbines, two cruisers or whatever. So that was really not part of the…, it's just that I knew why we had chosen the LM 2500. I was happy with that.

The other thing I discovered in my time down there was reverse osmosis. I [didn't] discover it, I'm sure the technology was available up here but it was a developing technology that I certainly reported on and I learned of course a lot about reverse osmosis by going through the details and so on.

INTERVIEWER: So the CPF indeed does have a reverse osmosis.

CUNNINGHAM: Yes and so does AOR, and the two AORs. I was happy to see that happening.

INTERVIEWER: That would be a huge improvement over the old evaporators.

CUNNINGHAM: Oh yes. So then we come back to the old Helicopter Hauldown and the first engineer that sailed *ATHABASCAN* out of Davie Shipbuilding was a guy called oh I'll think of his name in a minute - anyway he quit the Navy and joined the… who built the Helicopter Hauldown?

INTERVIEWER: DAF INDAL.

CUNNINGHAM: Yes he joined DAF INDAL and he came down to Washington to sell the Helicopter Hauldown system to the USN. He had brought down black and white photographs of the test establishment that looked as though the thing was being developed in a mud bath. I was never so embarrassed in my life. In any event he was a reasonably glib talker, always had been but I didn't like him very much and we had a very hard time. Then I got involved in the contract negotiations, we were trying to sell them fifty, and we were telling them what the advantages of the design were and we [they] had the brown shoe navy which was the well, carrier navy. They

had had terrible problems with hydraulic cylinders on their arrester wires. Some of the cylinders had lost a seal, produced a vapour in between decks and that exploded. That was the hydraulic vapour escaping in a cloud you know mist and I imagine the first spark would explode that. Big disaster so they wouldn't have hydraulics for helicopter handling. I said, "But we don't have the same problem because all the hydraulics are controlled with bladders, with diaphragms." And they said, "No, no you know, you must have some chance for it to leak. No ". We've been operating for such a long time so eventually we got through and Bob Douglas, that was his name - he was the first engineer of *ATHABASCAN* and Douglas didn't have any answers for this at all. Really annoyed me so I had to step in and virtually sold the goddamn things myself.

INTERVIEWER: Right, well did the USN buy?

CUNNINGHAM: Yes they bought fifty and they had options to buy more. So that was a grand achievement from my point of view. The DSS representative was very old hand. I got to know him extremely well. Again he was a field officer who totally disagreed with his bosses in headquarters. I don't think there was ever any field officer who agreed or felt anything of the people who…, I kept trying to find out why this was so but they really didn't have answers for me, other than it was politics.

INTERVIEWER: Well I suppose the, the guys in the field are faced with reality whereas the guys in headquarters are faced, faced with varying politics.

CUNNINGHAM: But you know they should be on the same team and you're responsible. I guess what happened was that the field people had no influence on their people in Ottawa at all. In other words they were to report back and tell them what the problem was and nothing would happen. Of course when we reported back to Ottawa things began to happen, that's what we couldn't understand. Except for this guy called Nicholson.

INTERVIEWER: Well I remember having some pretty good relationships and some bad relationships with DSS people. I think it was very personality driven.

CUNNINGHAM: Oh yes but as I say I had no problem with people in the field but always had problems with people coming down to write contracts or advising politicians.

INTERVIEWER: Anyway was there anything else in Washington.

CUNNINGHAM: Washington Helicopter Hauldown, yes not really. I saw the search for Sea King spares you know going on **all** of the time, but I was only peripherally, adjacently involved in that. What else went on? Oh the introduction of what we call the SHINPAD system; tried to sell it to the navy. That was a reasonably big deal. I don't know whether they actually got anywhere with that but they certainly were impressed.

INTERVIEWER: With the SHINPAD?

CUNNINGHAM: Yes, yes. We took down you know a fair number of displays and went to the David Taylor Research Centre and made a large presentation with them. So I had to do a fair bit of liaison work with that one. I also learned at the same time as I was making pres…, I wasn't making presentations, the people from Ottawa were making presentations, but I was setting them up and you know.

INTERVIEWER: Yes, so you would've run in to Jim Carruthers?

CUNNINGHAM: Oh yes Doctor Carruthers yes.

INTERVIEWER: Yes. We used to call him SHINPADS the sailor [chuckle].

CUNNINHAM: Yes and there was another guy that I knew well, anyway we had no falling out or anything; we got along extremely well.

INTERVIEWER: Yes, I don't know whether the United States ever went into SHINPADS or not.

CUNNINGHAM: They went in to something similar but they never did go into… I don't think they went into the combined system.

I was the liaison officer for our representative in Annapolis. We had one guy out of college with a degree who is now teaching in Annapolis as an exchange officer. That was interesting so I had a good look around Annapolis. We went down to Norfolk for all sorts of military things. EMPRESS trials, did the first one, I don't know whether you know what Empress is. I did the first Empress trial on SHEFFIELD, HMS SHEFFIELD whose engineer was a friend of mine from Manadon. Any rate the EMPRESS trial is one where you take a huge capacitor, you charge it up and then you run, string a line between it and then you let it fly with what is essentially called a nuclear, essentially it fakes a nuclear blast. It's electronic nuclear blast. And you check and see what happens to the ship when it receives this electrical impulse.

INTERVIEWER: Yes well that would be quite a capacitor ???

CUNNINGHAM: Oh yes a huge thing. Any rate, so *SHEFFIELD* did it and I watched those trials because *HURON* was coming down the next year. So I watched the trials in *SHEFFIELD* and got to know my old chum again and then *SHEFFIELD* was sunk in the Falklands.

INTERVIEWER: Yes in the Falklands. Yes it had problems with aluminum superstructure.

CUNNINGHAM: Yes some of that yes. In any event so then *HURON* came down and I had here I was now doing calculations about mast height. No one knew what the mast height of the 280 was.

INTERVIEWER: I guess the point of that test would be to see how the electronics in the ship would stand up to a transient like that? A transient impulse?

CUNNINGHAM: How many of the outside… mostly the elect… the induction was mostly in the electrical lines, not in waveguides because really didn't have much effect on waveguides. But yes on all of the wiring that went between and so on. They had to run signals between the shore and the ship by fibre-optics because they didn't want the coupling to occur in the transmission line and so they had triggers on board through the fibre-optics to say here is the pulse and here's the time of the pulse and then it would set the scope and so on so they could measure it.

INTERVIEWER: How did *HURON* fare in all that?

CUNNINGHAM: Not well. No there were far too many … we weren't well shielded you know. The wiring itself was shielded but the openings and the bridge and so on let too much through. The mast wasn't very good either - tubular mast - and that bloody thing; I don't know whoever designed that but they were made of tubes and they were filled with, I don't know whether you know what dog shit is. The ends were filled with the bloody dog shit and the top would leak and run down inside corrode inside and leak out the bottom. And the wiring on that mast; just awful. I saw it, oh maybe two to three years after, when I was the Squadron Engineer, I would go up around the mast and look at the wiring coming down and I'd say, Jeez that's ugly. This is not going to last much longer than now and we're only, what, ten years old.

INTERVIEWER: Right. So did they ever address that as an issue?

CUNNINGHAM: Yes they replaced all of the wiring; I'm pretty sure they replaced the mast.

INTERVIEWER: Okay no I'm thinking of the poor response to the electro-magnetic pulse. Did they ever address that as an issue?

CUNNINGHAM: They addressed it as an issue and I helped to do it in the CPF by going through the wiring itself making sure that there was no cross talk, there was another difficulty with just cross talk) between the line[s]. So any rate we did that in the CPF. I was part and parcel of that on the CPF.

INTERVIEWER: Right so they learned lessons from the…?

CUNNINGHAM: Yes but the *HALIFAX* didn't learn anything. *HALIFAX* was a nest of worms whereas the other ones eventually straightened out a bit.

INTERVIEWER: Yes well I guess there was a big learning curve on it.

CUNNINGHAM: Oh yes and of course you know Irving was saying that he knew how to build ships and so on. He's bloody… you know.

INTERVIEWER: Well they hadn't really been into ships of this type.

CUNNINGHAM: No I know, and he kept insisting he knew all about it.

INTERVIEWER: Yes well that's probably good salesmanship but in one interview that I was able to do the whole history of Saint John and how it brought itself from being a rather creaky old fashioned shipyard to really being quite state of the art.

CUNNINGHAM: Well it wasn't really a whole lot better than Davie Shipbuilding. They had a capability of lifting, but the dock belonged to the Department of Transport. It didn't belong and so the cranes that were able to lift the huge sections of ship were not Saint John's cranes and that's the only thing that allowed them to compartmentalize and they didn't do a good job of that in *HALIFAX* at all. They came up with pipes over here and,

INTERVIEWER: This is in the *HMCS HALIFAX*?

CUNNINGHAM: Yes, yes the first off.

INTERVIEWER: First off yes. 'Cause, according to people, they did quite a lot of improvement as the program went on.

CUNNINGHAM: No question about that but *HALIFAX* was the one that I was dealing with mainly. While I was in Paramax I was dealing mainly with *HALIFAX* and *VANCOUVER*. Those were the first two out. I was also dealing with Davie Shipbuilding again and discovered information that we had sent down to Saint John wasn't being delivered to the follow yard. Fools.

INTERVIEWER: Fools. Okay so I'd like to actually talk about that period in Paramax and when you were a QA Section Head in the CPF Combat Systems.

CUNNINGHAM: Yes well that's all that Paramax did was develop Combat Systems and the Machine Control System.

INTERVIEWER: Yes, there's one aspect that I have a personal interest in. Maybe you can shed some light on it; how did the fitting of CANTASS and the SQS 510 sonars go?

CUNNINGHAM: I don't know.

INTERVIEWER: You weren't particularly involved in that?

CUNNINGHAM: No, no we didn't do the physical CANTASS. We did all of the controls for it, but we didn't do any of the … whoever was the manufacturer of the tail.

INTERVIEWER: That would have been Gould Electronics in the States - Martin Marietta.

CUNNINGHAM: And so that was delivered independent of Paramax,

INTERVIEWER: Right.

CUNNINGHAM: and so we knew what the function of it was and of course they had already tested out the consoles and so on and so we fitted the controls, but we didn't see the tail at all.

INTERVIEWER: Right. No I was thinking more in terms of I know that these systems were delivered to Paramax for fitment so Paramax and Saint John must have done quite a lot of work to prepare for that and I'm just wondering how that delivery,

CUNNINGHAM: I didn't see very much with that at all because we had nothing to test. I certainly saw all those computers and so on and you know Paramax had a Faraday Cage and all of the combat systems in the Ops room and on the bridge and so on were all fitted out up there.

Then we had two sections, one was the test section which simply ran a test on each piece of equipment and it was set up in Ship Six. Then we had the other side which was the combat system put together for software developments and that's where they developed the integration of it. So I guess thet last one was delivered as the final ship set or something.

INTERVIEWER: Final yes so maybe you can just tell me what your role was primarily there and what sort of issues did you get involved with?

CUNNINGHAM: I got involved with the Machinery Control System which was done by CAE. I didn't really like the way they did things but they were a very good company and they knew what they were doing. They tended to build things one off, in the same way as they would build. They were good you know, they were excellent at building aircraft simulators. That was our main reason for getting into this kind of thing and they did an excellent job except that they couldn't produce the design and they couldn't therefore produce a test procedure. So none of their equipment passed any specific test, although it worked and it took an awful lot of work onboard to eventually set it up so it would work. They would come down and burn in values which were based on theory as opposed to actual fact and they should have waited until…, mind you that probably would have cost them a lot of money too. It was arse-about-face in terms of developing a control system, although in the end it would it eventually worked. It worked out but, when we delivered I refused to accept the equipment because it had not passed any test.

INTERVIEWER: Yes it would be very difficult for QA wouldn't it, a situation like that?

CUNNINGHAM: Yes, and my overlings wrote it off, which pissed me off. Then Saint John refused to accept it for exactly the same reason and I said well over to you guys, you're the ones who accepted it not me. I, I became a little unpopular at that stage,

INTERVIEWER: Yes. So eventually the thing did get accepted because NDHQ came in and said accept it notwithstanding this, that and the other thing.

CUNNINGHAM: No it wasn't where I was; I was part of Paramax now, quality assurance in Paramax and my bosses in quality assurance said no we'll accept it and now we tried to present it to Saint John and Saint John refused it which was within their right. Eventually it was simply fitted and I guess Saint John and CAE eventually worked out some sort of promise between them that they would fix it.

INTERVIEWER: Paramax became the meat in the sandwich here a little bit.

CUNNINGHAM: I don't think so because my bosses accepted it, but I was never told why or how.

Any rate so I carried on and I did a lot of wiring inspections in terms of cross talk and that sort of thing and a whole host of… We set up systems basically, systems for inspecting, systems for ensuring that what we were delivering we were able to prove. The Gulf War came up in the middle of that and we sent a lot of equipment off from the CPF program down to Halifax. I to some extent objected to that because we didn't know what we were sending. I said if we don't know what we're sending how are we going to get it back [chuckle]? Any rate we sent it off in a big rush and again I was overruled on that one. It wouldn't have taken much effort to define what we were sending, but they didn't want to spend the time and you know I guess I was getting more and more unpopular with this lot.

Next step along there came software design. I knew that the old UYK 20 had come up and is now a UYK something or other else and really all you had to do was change the software and you change the function. It was the same piece of equipment but it would never do what that one did.

INTERVIEWER: Right exactly so it was a software issue.

CUNNINGHAM: So it was a software issue and I said we've got to have some sort of identification, some configuration control of that unit and that unit so they can tell them apart and they refused to do it. So eventually they let me go because I suppose I was getting a little too difficult or whatever, I don't know. The other reason was we had come to the end of the program. They had to start reducing numbers and who do you reduce but the ones who are causing trouble.

INTERVIEWER: Of course first thing. Now what happened to Paramax? Did they just re-absorb back into Sperry now?

CUNNINGHAM: No they shifted from Sperry, the boss in Sperry got himself tangled in Congressional investigations in terms of kickbacks, defense kickbacks and all that and Sperry had to give up Paramax and they sold it to Unisys, which was, an offshoot of Burrows Machine

Company. Any rate so Paramax became part of Unisys and then it was absorbed by Unisys and shifted back down to the States. They closed down Paramax in Montreal entirely and they tried to make off with our pension plan. Well what they had done, they had a pension fund and they had invested it and it had grown to an extent greater than they thought was necessary to feed back to the employees. We put together a class action and got our money back. It really didn't amount to a whole hell of a lot because I got it all back in one year and I paid income tax you know, you paid more back. I lost half of it to income tax.

INTERVIEWER: So Paramax was created specifically for the CPF.

CUNNINGHAM: That's right, out of Sperry.

INTERVIEWER: when the CPF was over Paramax re-dissolved back to...

CUNNINGHAM: Folded yes folded. One of the things that really annoyed me about the situation was that we had parts identification. You know we hold thousands of parts and the parts identification which we had to run from the identification program in order to deliver bits and pieces so every computer staying and so on had a number and we fed all of this to a main frame in St. Paul twin cities there St. Paul, Minneapolis. Any rate we had no time on the main frame so we couldn't get changes run through the bloody thing. We were always running late trying to sort out what we were dealing and delivering and so on. The numbers kept changing and essentially what we were doing was feeding their bloody main frame. You know justifying the main frame and the PC was just coming into its own in those days, and while we had thumping great disc drives in the Combat Systems,

INTERVIEWER: Like washing machines.

CUNNINGHAM: yes they were and so the technology was all great but the PCs were coming to a point where they were capable of handling this number crunching, this change in design and change in configuration quite easily. You could do it on a desktop, but they wouldn't let us.

INTERVIEWER: So would you say that out of the Paramax experience with CPF do you think there was a contribution to the general technological capability?

CUNNINGHAM: Oh yes.

INTERVIEWER: industrial capability of Canada?

CUNNINGHAM: Yes, yes the technology, well I don't think so in the end, I think the CPF benefited greatly, but they didn't keep any of that technology back. No most of the higher techs if you like were American and many of the people that were Canadian, not a lot of them went back, disappeared back with the company. In other words they were Canadian to begin with, but they became Americans.

INTERVIEWER: Yes, but a lot of the Combat System that went into the CPF was based on SHINPADS. It was based on UYKs, whatnots and a lot of that was developed by the Matrix, or at least pushed by the Matrix and so it isn't really in that sense maybe not Paramax per se, but there was a lot of technology created for the CPF by NDHQ primarily and their various clients.

CUNNINGHAM: Yes, the one problem that I don't think was ever resolved is the constant changing of the software and the maintenance of what one would call a ship' set of software or you know a standard software for any of them.

INTERVIEWER: Well yes actually the Navy ended up creating a whole officer classification having to do with software maintenance and software design.

CUNNINGHAM: And Tunney's Pasture wasn't any great help either was it? So that you know any rate I retired and I was quite happy now.

INTERVIEWER: Right. Well I'd like to thank you for a lot of insights. You've obviously you know in a span of a career, I know we didn't talk about.

[Pause, audio file entitled Interview B]

INTERVIEWER: Okay Joe we were just finishing off with Paramax and then you realized that there were a couple of other things that you wanted to talk about.

CUNNINGHAM: When I came back from Washington I worked in the Maritime Headquarters here [Esquimalt] and nothing really remarkable in terms of development, but I was glad to get back to the Navy, naval operations of things, and as a consequence I was trying to control out of the Maritime Commander's Headquarters, not control so much but to advise on current *SAINT LAURENT* problems like nozzle boxes and so on. So I became I suppose known for my ability to understand and repair ships because I had been through so many refits. Then I was designated to be the first commander of 404 CFTSD which was the Naval Overseer for refits on this coast working out of, then, Yarrows Shipbuilding which became a whole bunch of different names but essentially the same place.

During that time we refitted *PROVIDER, MACKENZIE,*… two others and these were refits that were unmanned refits and those had turned out to have some peculiar problems but nothing in terms of ongoing technology change, but it was interesting to see the growth of shipbuild…, the fallout of shipbuilding programs on this coast; them falling apart and centering in Burrard Yarrows. I went over to Burrard Yarrows to talk to them about why the west coast did not receive as many shipbuilding programs as one might expect them to receive and I suggested to them that because B.C. votes NDP mainly those days, not Liberal, that was why they weren't getting very much business. And I was attacked to some extent by my suggesting that was the wrong conclusion, but I in fact still stand by it and that's why we have not received a major shipbuilding program. We've received the second phase out here as opposed to… The thing that struck me about shipbuilding on the west coast is it's always been on time, within budget and

reasonably well done. In other words the work has always been quality. Back east in Vickers and in Davie Shipbuilding they were always late. They were always creating new and beyond budget costs and it was the standard policy back east to do that. Hal Ships did exactly the same thing. Saint John did exactly the same thing. Each time they tried to bill and I got awfully annoyed with the politics of granting shipbuilding programs to…, when people out here were better qualified to build ships and yet were denied through political refusal if you like.

And the other thing that annoyed me was the difference between the Halifax Dockyard and the B.C. Dockyard. The B.C. Dockyard was paid a higher wage than the dockyard in Halifax. They hate that idea and they think that the dockyard in Halifax should be paid an equivalent wage to the ones out here because they do equivalent work. But they don't do equivalent work. They produce equivalent results over a longer period of time. And the whole wage freeze on the east coast would get turned upside down if they were paid an equivalent wage to out here when the cost of living back there is quite different than it is out here. So those are sort of the observations that I've had since then.

INTERVIEWER: Can you offer any reasons why the quality of the west coast varies from being much better; like there must be something in the way of technology or just management or something?

CUNNINGHAM: It could be management. It could be because of one of the strangest or you know most natural things is that we have a greater time to do a job because of the weather. We don't need to close… we don't need closed fabrication yards. We don't need sheds and big structures. It can all be done outside and the quality turns out as a consequence to be better because it's not faced with rain, freeze, difficulties with delivery in the Maritimes; everything has to come from Toronto in the Maritimes or else from Montreal. We have a good deal of local delivery. Boeing in the States has you know is able to provide a good deal of technology. There are diesel manufacturers in the States who can come up and certainly have helped in the maintaining the diesels from the west coast ships. For some reason they never seem to be able to do it on the east coast.

INTERVIEWER: Right. So do you think Yarrows during this period of time would have had the same capacity as Davie and Saint John?

CUNNINGHAM: Oh no not the same capacity because they weren't as big, but they certainly were able to handle refits. Yes they were able to handle refits much better than any of the big yards and they had they been given construction work. They would have risen to it quite easily. In fact they were given I think a Coast Guard vessel and they rose and they actually built the super structure here and barged it over to Vancouver to fit it on the ship and it fit. And they had been lengthening ferries and Yarrows at that time and that was a complicated job but it worked a treat. So they were certainly capable, they just weren't given the work.

INTERVIEWER: Yes well now of course they just got the shipbuilding job so maybe things will start to turn around.

CUNNINGHAM: Yes but I wish they'd been given the new ship program as opposed to the second tier. The replacement of the CPF has being given to Saint John and Saint John is going to wring it out and you know cost us more than we really need to be costed. I will never forget Saint John during the CPF program claiming that he was such a good shipbuilder and then he fired all of his electricians and brought in eighteen of them from part of Harland [Wolfe]. Or not all of them, he fired a good number of his electricians, brought in eighteen from Belfast and said that Canada didn't have electricians in the shipbuilding industry.

INTERVIEWER: What would be his motivation for that?

CUNNINGHAM: I think he was trying to break their union. He was vicious in you know in that regard. He was the sort of guy that would…, the way Irving grew up was to buy up transport and then cut off people who were cutting trees by refusing to transport the trees. He then bought up the transport and refused to deliver oil to people he didn't like. And now he's [part] of this [off shore] occupy downtown and I don't know how we've ever given contracts to people like him who has given his millions to his sons without tax through the Cayman Islands. He stored all of his profits in the Cayman Islands and that's how their financial situation can be seen to be great. All he has to do is inject a few million dollars from his moneybags.

INTERVIEWER: Any way that's a pretty good comment on the difference between the east coast yards and the west coast yards and you feel that the central issue really there is the climate.

CUNNINGHAM: Yes well the central issue is the climate and it helps too, if you're faced with the climate you get frustrated by it and people out here are not frustrated by it and therefore they tend to produce happily if you like.

INTERVIEWER: Yes, yes so there's a whole psychological element.

CUNINGHAM: Well if you're not, if your weld turns out well the first time because the weather's good then you tend to improve a little and become an excellent welder. Where if you're always frustrated by having to heat the quiv…, the rod, your welding rods that are in a heated quiver and then developing flaws in the weld because of the…just ugly.

INTERVIEWER: Thank you very much.

Interview ends

ABBREVIATIONS AND ACRONYMS

AOR	Ammunition Oil Replenishment ship
ASTM	American Society for Testing and Materials
CANTASS	Canadian Towed Array Sonar System
CFTSD	Canadian Forces Technical Service Detachment
CPF	Canadian Patrol Frigate
DMCS	Director of Maritime Combat Systems
DMEE	Director of Marine and Electrical Engineering
DSS	Department of Supply and Services
EMPRESS	Electromagnetic Pulse (EMP) trial
IRE	Improved Restigouche Class
NCDO	Naval Central Drawing Office
NDHQ	National Defence Headquarters
PC	Personal computer
PNO	Principal Naval Overseer
PSE	Project Systems Engineer
QA	Quality Assurance
RCN	Royal Canadian Navy
SHINPADS	Shipboard Integrated Processing and Display System
TRUMP	Tribal Class Update and Modernization Project
USN	United States Navy
VDS	Variable Depth Sonar