Dr. Armido DiDonato

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Introduction: Welcome to the Dahlgren Centennial Celebration - A Century of Innovation. We hope that this and our many other products, events and offerings will showcase what Dahlgren has accomplished during its last 100 years.

Throughout our history, we've interviewed some of the most prominent minds, leaders and innovator that have been here, and we're opening up the vault to share them with you this year.

Today we are honored to listen to the story of Armido DiDonato, who came to Dahlgren as a mathematician in 1954. Dr. DiDonato developed software for submarine computers and worked on missiles such as the Polaris and Poseidon.

Let's listen to Dr. DiDonato. . .

Rife: This is Jamie Rife and I'm at Dahlgren, Virginia and I am interviewing Dr. Armido DiDonato.

He is now in T Department. It's the 13th of August, 2003. Can you tell me a little bit about your education and career and how you first came to Dahlgren?

DiDonato: I have a bachelor's degree from Duquesne University in math and physics. I have a master's degree in mathematics from MIT and I have a doctor's degree from the Carnegie Melon University

I came to Dahlgren in 1954. I was interviewed by Dr. Charles Cohen and Dr. Allen Hershey. And after I interviewed with them, I knew I would be here for the rest of my professional career. I don't know what else.

Rife: What did Dr. Cohen and Dr. Hershey do? What were there job division?

DiDonato: Dr. Cohen was a geologist who worked here as a mathematician and he was the best we had. Dr. Hershey was a mathematical physicist that I worked directly under and he did work in stressing materials, all theoretical, highly theoretical – way ahead of his time. You will see papers published twenty years later that he had written about twenty years before. Very, very outstanding scientist, both of them.

Rife: What about Russ Lyddane?

DiDonato: Russ Lyddane I didn't know very well. He was a prime mover here. Professor from Virginia University who came here and

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was head of the department. He was a very good scientist and after he retired from here he continued to work for Dahlgren as a scientist in satellite theory.

Rife: What is your current position and responsibilities here? What are you doing now?

DiDonato: My current position is that I'm the staff mathematician reporting to the division head. What I'm doing now is I work on developing software, using mathematical and theory and ideas and physics for trajectories, for eliminating threats to our country from missiles.

Rife: When you first came to Dahlgren in 1954, what were some of your early responsibilities? What did you work on?

DiDonato: My early responsibilities in those days…we worked on ship waves. When the ship travels through the water it develops a lot of energy which is no value to it, just makes waves and how do you minimize these waves. So that was one problem we worked on. There were many other problems.

Rife: What about Polaris? Were you involved in that?

DiDonato: Polaris. . .I worked on mathematical sub routines for Polaris software. There routines were installed in the submarine computers, the computers about the submarines.

Rife: What about the mathematics involved in that? How complex was it?

DiDonato: It was in the early days of computers and the numerical analysis – which is what's involved – was not a well known subject. As a matter of fact, in all my education I never saw a course offered in numerical analysis in those days. So I came here not knowing practically nothing about numerical analysis and we all learned together here because we had this fabulous machine at the time, the NORC, and we made many mistakes because the few numerical analysis books that were out were not very good in the sense that they would tell you how something should be done and you would find that it wasn't quite the way it worked.

So we were pioneers and I don't know if anybody told you, but when got the NORC, we insisted that the arithmetic routines – add, subtract, multiply – the arithmetic operations, I should say, would be checked. That the computer would automatically. . . no computer up to them was check as far we knew. As a matter of fact, before that we had what was called Mark VI machines.

Rife: Mark II and Mark III.

DiDonato: Yes, II and III. And we had two of them. And if we got the same answer . . .run the same problem on both and got the same answer, we though well it's probably right. But it was just. . . as I recall they though very hard not to do that. Not to have checking, but we insisted on it and of course they really made IBM because they were able to start producing computers for checking procedures for arithmetic.

Rife: I'm actually reading Dr. Nieman's history of computer tech.

DiDonato: Ralph Nieman, he was not a doctor

Rife: He discussed his battle with IBM to get them to do the auto-checking feature on the computer.

DiDonato: Not many people know that.

When I came here in ’54 this lab – this program wasn’t here – but this lab had about three Ph.D’s, now we’ve got over 100. But it was ready to be closed by the Navy. There were two people that saved it, in my opinion, Ralph Nieman and Dr. Cohen. They essentially had nothing to show for that here. No plaques, which is kind of amazing to me. What they did, they had a battle royale with NOL, the Naval Ordnance Lab, which is now closed.

And we both wanted the NORC and Ralph Nieman, with Dr. Cohen as his technical person. He was a manager and Dr. Cohen was a technical person. They gave the arguments to convince the Navy to put it here. And it is a standing joke here, NOL never forgave us for that. But that’s what saved this laboratory here, this center, it’s a center now. Actually those two men were responsible and yet there’s nothing, no plaques, no nothing. There’s a lot of plaques for other people, but not for those two. It’s funny the way history gets worked.

You can always say something, but. . . Dr. Cohen is still alive. It would be in your interest to talk to him.

He was a prime mover here. Tops. The most important man this laboratory had of everybody, of anybody, in my opinion. And he was a geologist who became a mathematician.

Rife: According to Dr. Nieman, regarding the Mark II, Dr. Bramble, at the time. . . because Mark II had been a solely Dahlgren effort. Dahlgren had brought Dr. Abel in and then Naval Ordnance Lab decided that they wanted it. So they made a pull for it and they had another battle royale in 1941 and as a result of that, it was actually NOL that initiated contacts with IBM to get the NORC. The Naval Ordnance paid for NORC and we still got it.

DiDonato: I mean the NORC, in spite of the fact that they originated it. But it was our good management checking the arithmetic that made that go and we had scientists from all over the world come here to run problems. It was the best computer of its time. And it only did fifteen thousand operations a second. It was a fabulous machine.

Rife: When was it retired? When was it superseded?

DiDonato: Oh I don’t know. It was I would say about five years after I was here. That’s just a guess.

Rife: Okay

DiDonato: 1960. Computers have moved along, it might have been a little earlier than that. Now you operate from a remote terminal and so forth. But in those days we would go down and sit at the machine with the operator and they had somebody in charge who would – Carroll North. And he would allot how much time you had. So you had like two minutes and the operators would actually

punch in the starting instructions for you. Like you read them off to him and if he made an error, of course, some of your time was eaten up and you would go beg Carroll North for another minute, please.

It was really amazing how we ever got any work done on the level because that computer opened up a whole new realm of problem we could look at that we were never able to look at before because we didn't have the computing power. We begged for time on the machine. But, of course, there would be thirty people that wanted to get on and, you know. But you went down and sat at the console with the operator. So times have moved ahead.

Rife: What about satellite work and naval space command?

DiDonato: Lyddane came up but Casov is the one . . . he worked with Dr. Lyddane. After Dr. Lyddane left here, on trying to find how they could predict satellites that kept going around the world, after it had gone ten or twenty times, there were too many errors were starting to become introduced into calculations. How could they do that more accurately and more quickly to keep up with real time with what these satellites were doing? As far as I know they never completely succeeded in that.

But they were two, Casov and Dr. Winter was an astronomer here and he was very good. Dr. Lyddane was super. I think Dr. Lyddane went and worked with GE.

Rife: Yes, I think he stayed on the advisory board or advisory council.

DiDonato: But he was still very active in scientific work. They have an outlet here, NASA – not NASA – I can't think of their name. But they keep track of all the satellites in the sky. And that's not us, that's another.

Rife: I think it's called Naval Space Command.

DiDonato: Yes, Naval Space Command.

Rife: This is probably off the line of questioning, but it's on my mind right now and maybe you can help me and maybe you can't. During our first meetings here – this seems so mundane – but Captain Davidson mentioned that at one point – and I'm not sure if this was in the '60s or '70s - but because of complaints from gun firing that someone erected a billboard that said, "Don't mind their noise, it's the sound of freedom." Do you know anything about that?

DiDonato: No, never heard about that. The funny story is, you know, that – I don't think they do it much anymore, at least I don't hear them – but they used to test the 16 inch guns on the battleships and shoot the shells down the river. And one day a lady called from Colonial Beach.

And she said, "Something from you people landed in my yard. I wonder if you could come and get it. " {Laughter} It was one of the 16 inch shells. We told that story for many years. Another time I worked in one office and right across the hall was Dr. Cohen's office, and a shell exploded and a piece of the scrap metal hit his window and tore out part of the woodwork. Windows were made of wood in those days, the window frames were.

Rife: Was he in the office?

DiDonato: I think he was in the office at the time. But you know. . .

But you know we all had to go look. But it didn't bother us at all. And the other thing is when they shoot those 16-inch guns they always sound the alarm before they shot it. And so, it's amazing how your mind becomes accustomed to that. But when you have a visitor, they would jump because the alarm wouldn't register in their brain, now there's going to come a big sound. And so we'd look at them full, you know, we should have told you. We got quite accustomed to them, they never bothered us and we were very near where they shot the gun at in Building 218. You probably what Tom Sherman is.

Rife: Yes, it's now G Department. It's actually where the NORC and the Mark II andII were housed.

DiDonato: Our offices were . . . that's building's still here. I'm surprised they haven't torn it down. It's a very nice building.

Rife: It's still humming inside, very busy there.

DiDonato: The library's there. So I never saw that sign you were talking about, but I heard of it. I never heard anybody complain about the guns.

Rife: In the '60s, urbanites coming down from DC were starting to populate. . . that's when the first commuters were starting to sort of travel outside of DC to set up their homesteads and upscale, suburban people, maybe in LaPlata, maybe a little bit closer who were setting up their cottages beside the river were the ones who. . .

DiDonato: I'm sure there were complaints, but I didn't hear about it nor did I see it on paper.

Rife: There were age-old complaints going back even in Indianhead and actually Indianhead, that instituted the plot that more less forced the Bureau of Ordnance to make a decision to move hidden caliber guns to Dahlgren was a very similar incident in which a 16-inch projectile – because at Indianhead they had to shoot straight. Well the 16-inch glanced off a gauntlet and traveled a mile down the river and landed through farmer Swan's house, and wrecked his kitchen. He was pretty easygoing about it but his wife was not a happy camper so Indianhead, they had to go fix their house completely using station labor. And then shortly after was when the Bureau made the decision to set up Dahlgren, because of that.

Rife: K Department in the '60s. . .what were of the things you in the '60s and '70s that you worked on?

DiDonato: Well I told you about developing software for the submarine computers. Polaris was a big thing in those days

Rife: What about Poseidon, was that more of the same?

DiDonato: Polaris was the first one as far as I can remember and then Poseidon followed. And the same of problems. . . it was a much better missile so it moved

further and you could get higher up in the sky and so forth. And the accuracy that they required was higher, and so it took all the problems you had before and magnified the difficulties and they were all solved here with cooperation from Draper Laboratory. Draper was a first-rate outfit, to this day they still are. They worked very closely with us here.

Rife: What about the military? One of the things that were found in the 1930s and the 1940s was that the military had a great deal of resentment against mathematicians, scientists, engineering personnel, and that in the '50s when Dr. Lyddane and Dr. Cohen began transforming into a science station, that that sort of diminished. What kind of relationships have you experience with the military?

DiDonato: That's interesting. In the old days - and I'm talking of when I first came and probably for five or six years later and much before me – civilians could live on the base. It was a very nice place to raise children. I raised some of my children here. We had a school on the base up to the sixth grade, I think, and all run by government teachers, they were civil service people. And the military lived on the base as well. And as far as I was concerned we got along just fine. They had their own society in some situations, but in a lot of things, like my wife belonged to the flower club and there were military and civilians mixed up in that. But there were some things military-wise such as raising money for funds of their own, stuff like that, they didn't.

I thought it worked very smoothly. I never heard of a problem where there was an open hostility or anything like that. There were some military that didn't realize that value of the civilians, that the base was open because of the civilians. But they were few and far between, most of them were very nice. We also had an aviation group here, navy flyers, and they were really a partying bunch. They partied a lot and were in their society in those days. There were dances every month at Como Club. And because were on the base and there wasn't much to do except whatever you generated for yourself. . .

Your kids could play in the street with no problem, very few. It was very small then. But it was a very nice place to live. As I said, I knew that I wasn't a failure if I got promoted and went ahead, that I would be here the rest of my life because it had clean water, it had athletic fields and a gym, and tennis courts, and the work was great. And I always felt, if you wanted to lay this equipment, go with the government. Even when I was young man, I kind of realized that. And that's been true to this day. So that's the reason I felt I was set here. They had clean water, clean air in those days. I was just beautiful here.

But it's not as nice as it used to be.

Rife: What happened to the Aviation Department? They don't fly the planes out of here.

DiDonato: Not anymore, that's all gone. But in those days, they did and you could actually, if you had something to do in Texas or something, they would fly you there, if you wanted to fly. But they trained here, the aviation group. And those hangars are still here. But all of that is gone. I think they have a private flying club here but, you know, just something like that, but I don't know. Sometimes they test helicopters here. I don't know much about that but they might be navy flyers that are doing that, I don't know.

Rife: How would you describe the culture here at Dahlgren in the K Department or the T Department, as you work now.

DiDonato: The culture has changed a lot. I don't know if this is something on the record or not, but in the old days they had a lot more confidence in the navy scientists when we came here. And we said, "This would be a project to work on." Or admirals would actually have the navy scientists together in meetings and saying, "Tell us what we should be developing. Tell us what we should be doing." And so we had a lot of freedom without a great deal of concern for money. Of course if it didn't cost as much in those days as it does today. Today it's mostly contractors who do most of the work and I just get the feeling that the navy scientists don't have the impact nor the respect that they once did. So that's my picture of the culture.

The managers in the old days were scientists and so they understood the problems of scientists. Today the managers are business oriented. So culture has changed tremendously.

Rife: Well, that's something that we've noticed that it tends to be like a corporation rather than a military science station.

DiDonato: I worked with DuPont before I worked here there couldn't be a nicer company than DuPont. But it was more corporation. I wanted to just do science work but I didn't want to be a professor either. And I thought, " Well, the government is maybe where I should go." But that's culture's all changed. I used to recruit and I would have a hard time recruiting today. It's just not as ideal a situation. . .place to work as when I came.

There's such a focus on money that . . . scientists can't work like that. I mean you've got to be given the freedom to think and the freedom to be uninhibited by the money factor. And we didn't have those problems in the old days. It was like, what is this project, how good is this project, what will it do for the navy, and that was it. If we said, "The navy should do it," it got done. So we felt very important in those days and we feel less important today.

Now there are exceptions to that like our GPS work. That's a man you should talk to, Allen Evans.

He's our major man in GPS. GPS is where everything gets done now for locating where you're at, where missiles should go, and all the guidance is done in the GPS. He's one of the leading experts in the world.

So there are exceptions. Scientists in their work, using his value and so forth, but most of the others is mostly contracting now that gets the challenging research type of work. We're more or less relegated to checking it. Which is important, very important too. But in the old days we were the innovators.

Rife: How about Barney Smith, did you know Barney Smith?

DiDonato: Yes, I knew him. He was okay. He wasn't Ralph Nieman.

But they have a Barney Smith award and so forth. They don't have any Nieman award, but they should. You know, when they give an award at the end of the year, they have a Barney Smith award. I don't know how that originated. Barney Smith was ok.

Rife: Well, what can you tell me about Nieman. He came down from Harvard with the Aiken machines.

DiDonato: He was a bachelor's degree programmer. He simply was a bachelor's degree, but in those days, you know that was pretty good. Today it's not so much, you need an advanced degree. But he was a programmer and he wasn't a bad programmer. But he needed – remember the group of scientist was small here in those days. In our group there were about five of us. And so . . . and there were two or three other labs and they had about five people. There was one chemist on the station and so forth. So Ralph Nieman was our programmer and he became head of the programming section, which had maybe ten programmers, five programmers.

And Lyddane was leaving. I believe it was Lyddane leaving. I might be wrong, it may have been somebody before him. But anyway they offered the head of the lab position to Dr. Cohen. He said he didn't want it. They offered it to Dr. Hershey. He said he didn't want it. So from what I understand they got to Ralph Nieman and offered to him, like, "What are we going to do, you know, we need somebody to head the lab" But he hasn't shown as a terrific leader or anything, but he's excellent. He turned out to be unbelievable. Given that opportunity, that window of opportunity, he made this lab into what it was. And he did with the technical expertise of Dr. Cohen. The two were a marvelous team. He was really responsible for this building and I remember how hard they had to work. Congress had to pass a bill to have this building put up.

Yes, That was. . . and Nieman and Cohen carried the ball on that. Well, of course, with the captain and so forth, you know. And the head of, well it wasn't the center then, the head of Dahlgren, whatever it was called.

Rife: It was technical director at the time.

DiDonato: Yeah, technical director, right. And so, but nobody wanted the job. Nieman took it and he was in it, I don't know how many years . . . he had so much insight. I remember going to him one time and saying, "This is ridiculous what we have here. They give us the responsibility for these weapon systems that can involve lives and so forth and then they do something stupid which is a complete contradiction at the kind of responsibility." I said, "You should do something about it, Ralph" –that was his first name, And Ralph said, "I'll tell you something Armido." He said, "We could do something but we may end up with something worse." I never forgot that. And so he was that kind.

And this particular situation I'm talking about is rather interesting. Through the years there may – and I don't know if you should print all of this. I'm just giving you a feel for things of how some of us old timers see things and you'll have to filter it and take what you think is worthwhile. But they decided we needed some ethical training. So they would require that we go some months to the theater and listen to a lecture on ethics. And so I went to Ralph and that's what this story is all about. I said, "Ralph, this is ridiculous. They trust us with all this other stuff, now they're going to say well we're not sure you're honest." It was so ridiculous. I mean . . . but as far as I know – and he said . . . the other thing Ralph taught me was, if it's not good for the navy, it'll go away.

And that's been my experience in fifty years here. And I tell all these young people, you know, they'll come in and say, "Can you believe what they did now?"

I'd say, "Look, that's no good fundamentally. Don't event worry about it. In two years we won't even know it's here." And that's been my experience, everything goes away. So I said to Ralph, you know, "This is crazy, this is inconsistent." And that's when he told, you know, you may end up with something worse if we do something. It'll go away, because its ridiculous. And sure enough, I think it's still on the books, honesty or ethics meeting.

Rife: How about Dr. Cohen? What kind of guy was he?

DiDonato: Quiet, tennis player, brilliant.

He had two properties which are very, very hard to find. One, he could get down and sit in on a technical review where somebody was presenting something they had developed and he could listen to that and he would ask the most critical, penetrating, questions immediately. And I never understood how he could do that. I mean, it didn't matter whether they were talking about a chemistry problem or a trajectory problem or a software problem, he somehow could get the gist of it and ask the right question. And that's why he was Nieman's right-hand man.

The other thing he had he could see the future. I mean that tongue in cheek sort of. He knew what the navy was going to need. And that's how he saved . . . he really is the one who saved the base because when the navy came and said we're going to need something on Polaris, how to compute these trajectories so we can get them home in where we ant and so forth, he was able. . .he and Nieman were able to say, "We already got it. We have it." NOL didn't have it. It was his foresight. In those days, you see, you could work on a problem with having to find money. So that's the thing that's missing today.

I'm jumping around a little bit, but . . . so he had the power to look at this problem and he had also the ability to know that they were going to need this. The navy was going to need this mathematical development of computing trajectories and the software for it. And so when they cam to say, "Well we need." We already got it." So we got the work. And that's how . . . and that's still here today with Trident. We still have the full responsibility for that. And he had foresight. He had an ability to know what the navy needed. I rarely seen a man from here as highly respected in Washington as he was. When he went to see a captain or an admiral, they listened to him. So that's what I can tell you about him.

And he lived on the base. See all these people lived on the base on those days. So we were like a happy family, you know. It was very different than today where people live in Fredericksburg, Colonial Beach, Richmond . . .

Rife: How about their successor? The people who came after them. Are there any that stand out?

DiDonato: You know, I don't know about successors. We had a lot of good scientists come. There were a lot of top-notch people and they stayed for many years.

Rife: How about Rob Gates?

DiDonato: Rob Gates, I don't know too much about Rob Gates. I think he was

in one of my graduate classes years ago. He evidently is very well liked and he's done well for himself here. You know, he's advanced and I remember him just as a regular employee. He's a division head now I believe.

He's very well like and his ability, he's pretty talented being in the position he's in.

Rife: He does a lot of work for administration, especially during the bracks.

DiDonato: That's the impression I had, that he's done that kind of work.

DiDonato: Robert Ryland.

Rife: Robert Ryland, okay.

DiDonato: Well, you're hearing me talk so you can follow from that. He's the one who designed this building. He's an electrical engineer from MIT. And he was our main man with the NORC, for keeping it up. Because you had 15,000 tubes in this machine. Something would go out every day with 15,000 tubes. I mean.

Rife: Just from the heat.

DiDonato: He maintained and filled the whole bottom floor with air conditioning, super air conditioning. And most of the other people that keep the NORC up used to go in at night and give two minutes, five minutes, or whatever. And the machine would break down.

"Oh no. How long will it take to fix?" Well they had these tubes, radio tubes and it would be like a module, like five or six radios just push it in and take it out, just like that. So they had to find which one of these to replace of these 15,000 tubes. There must have been 5,000 of those things.

So they wouldn't be able to fix it so they had to call Bob Ryland. He would come in and he'd say, "Armida," he says, "What part went bad?" "Well, in my arithmetic part didn't give the right answer." "Okay," he says, "I'll find the trouble in fifteen minutes." And he would take out his blueprint of the NORC and just logically follow what was done. And he would walk over and pull out one of the tubes, fix that one, and it would work. A brilliant man. And he was head of the . . . he had Ralph Nieman's job and he might have had it right after Ralph. He might have been Ralph's successor.

But he was very, very good. An excellent scientist, excellent . . . he designed this building which I think was a super building in those days. Now, you know, obviously with all the remote control [inaudible]. In those days this was a fantastic building. So that's Robert Ryland.

Let me see if I see anybody else I can tell you about. I don't know if this is worth anything to you.

Rife: Oh absolutely.

DiDonato: Okay. Hershey is in there. He lives in California. He is probably close to ninety now. I don't correspond with him anymore.

Rife: That's Dr. Hershey

DiDonato: I told you about him, that they were the two scientists here and that's when I first came to work for them. I worked under him and learned so much from him. And he's close to ninety. Then here's another man you should write something about. Milton Jarnigan, Dr. Jarnigan. Have you heard anything about him?

Rife: No I haven't.

DiDonato: Fascinating man. He was . . . I think he's the only genius I ran across in my lifetime. And that's including being at MIT. A real genius. I mean, he could do things like, oh, can you tell me October 2 in 1898, what day of the week that was and so forth. [laughter] And he liked nothing better for you than to ask him, "Can you give me a pi that's [inaudible]?" "Oh sure," and he'd write it right down. But that doesn't mean he1s a genius, but he worked for me directly and he was a genius, this man. And he solved many important problems here. He was . . . I'll tell you a few quick stories about him since you asked for stories.

He had a Ph.D. from Duke University. He was a Rhodes Scholar, a tennis player, because to be a Rhodes Scholar you had to have some kind of athletic. And that's quite an honor to do a Rhodes Scholar. And he was hard in many ways because he was a genius. I mean, he wasn't like most of us. But one time for that book of records that-what is that book called-you know where people try to get their name in?

Rife: The Guinness Book of World Records

DiDonato: Yeah, that's it. So these two ping-pong players wanted to see how long they could hit the ball back and forth and you know, they would . . .

. . . two or three hours. So this man had told me the story said, "Well there's only one guy to do this and this is Dr. Jarnigan. And this was when he was a young man before he came here. So these two guys hit for like five or six hours and he was there. This guy said, "I went to the show and came back and he was still counting there." So he could things like that. But he was, as far as I know, the only genius I ever saw in our . . . because you know geniuses, you know, don't come along very often. It was never a problem that I gave him that he couldn't either solve or show that it was so difficult that we didn't have a contributing power at the time to do it. Very, very brilliant man. So you can have this and if you don't . . . if you use them and don't want them anymore, you can return them.

Are you familiar with this book, "Fast or Faster?"

Rife: No sir, I'm not.

DiDonato: I'm amazed because this is the whole . . . since you're an electrical engineer, you might enjoy reading this book yourself This is the book on NORC that was written by two of the people at IBM, called "Fast or Faster," in 1955.

Rife: Wallace Eckard and Becca Jones. Yes, Eckard was an IBM honcho. AD: So do you think this would be a valuable .

Rife: Absolutely, yes. I did not know this book existed.

DiDonato: That's amazing you didn't know. You see, that's the thing. Some of the people here don't know of these things.

Rife: In engineering these days, they don't teach history, the history of engineering. It's all numbers. They don't fit in its proper context.

DiDonato: So much to learn, maybe that's the reason.

Rife: Yes, I never once in my four years of school, I never once had a class on the history of electrical engineering on the pure technology.

Conclusion: Thank you for listening to this week's Dahlgren Centennial Podcast, and hopefully you have learned another interesting aspect of what our people accomplish for the Navy and our nation.

We will continue sharing how Dahlgren is a one-of-a-kind location where innovation is heralded as the hallmark of each indvidual.

Tune in next week to hear from Dr. Charles C. Bramble, an early Technical Director of the base. Dr. Bramble was heavily involved with the Mark II Aiken Relay Calculator, Dahlgren's first computing machine.

Thank you for celebrating this century of innvoation with us at Dahlgren.

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