Career
Interviewer: Kate Foutz (granddaughter), 3/22/24

Kate
So we're gonna talk so we're we section this off so somebody is gonna drill you about college okay i'm gonna drill you about after college how did you decide or like how did you choose where you worked because you worked for the same company for did you ever change company or did you work for the same company your whole career

John C. Elsey
Yeah.

Kate
Right? So how did you get to that point, choosing that company?

John C. Elsey
When I was a graduate student at Illinois, the summer hires, some companies took summer hires and one of them was, that people seemed to go to, was Autonetics in California, which was part of North American Aviation at the time.

So in the summer of 1961, I worked, I went from, we were living in Illinois at the time, went to California and worked for the summer at Autonetics. And then, when I graduated in 1963, it was a great time to be an engineer.

Sputnik, the Russians had put Sputnik up in 1957 and people were afraid that they were way ahead of us technology and technology and they had missiles that could destroy us and it was a big panic. It turned out it wasn't really true.

We were really ahead of them, but the perception was that because they had this satellite in orbit, Sputnik, they were ahead of us. So we had to catch up and there was a lot of activity and money. So there was a lot of scholarships, I think, money available for students in engineering and jobs when you got through.

So I remember, I interviewed 10 companies across the United States and I thought to myself, this is a time I can do that. I mean, I might as well just go visit these companies. So they'd come on campus and solicit us and provide trips, expense paid and everything.

So I remember I interviewed 10 companies and had job offers from all 10 of them. It was interesting because typically, I think, when you interview the company representative will be asking you questions and trying to determine your qualifications.

But with that time, they were out to get us and just trying to present themselves in the best light. And one time, one person asked me, why do you think I should hire you? And it took me aback because nobody was asking those kind of questions and I didn't really know how to respond to that.

But it's a good question. Why should I hire you? He was an older guy and he used to maybe other times, but it was an interesting question. Anyway, I had 10 interviews and they all made me offers. When I went to Audenetics, I talked to a guy who was putting together what he thought and turned out to be kind of a special organization dealing with systems analysis.

And he only hired, well, made offers to people who were first in their class kind of thing. And I was, as an undergraduate, but not in the graduate students, I don't think. So he was an interesting guy and he said, we'll offer you the most money.

And I said, what if you don't? And he said, well, you let me know and we'll take care of it. And they did. And I had worked there that summer and I thought, I'm not going back here. But it turned out that they offered the most money in California.

It was a good place. So we ended up going there.

Kate
You really did have your pick.

John C. Elsey
I did. I had my pick of 10 jobs all over the country.

Kate
So you initially didn't want to go, but you stayed there your whole career. Was there a reason or it was just a nice situation?

John C. Elsey
Yeah, if you'd asked me when I was in college what I was going to do when I got through, I would say, I'm going to teach, be a professor at the University of Utah, kind of like my dad was, but I decided that I wanted to go into industry for a few years, see what that was like.

And I was going to give myself five years and then probably come back. But I had an interesting experience. My dad was on the faculty, like I said, and he had friends. The head of the EE Department was one of his friends and dad and he and another couple of guys had formed a small company and they came to our house to build their equipment.

So I knew them really well. And when I got my PhD, I talked to him really about a job, but I wanted just really to kind of touch base and he said, you know, if you'd come here two or three years ago with a young PhD, we'd hire you in a minute.

But now we want somebody who's young, who's got a PhD and can bring in a million dollars of research every year. And so I said, OK, thanks. And I went on to industry and I got in industry. I got in some really interesting projects and I reviewed a lot of the papers that dealt with the topic-

We were in automatic target recognition was the one we got mostly in and university published a lot of papers on that, as did other people. But the ones in the universities were very shallow and not very good.

And so I would generally just set those aside and not even read them. And then I understand the politics in the university were awful. It was hard to get ahead. You had to publish or perish almost and it was easy to publish.

Well, I worked for a person who wanted us to publish and so in one year I published four papers, went to four different conferences and presented them and they were not all that sterling or that great.

But I became impressed with how easy it is to publish and I felt a lot of times these conferences just exist so people can publish papers and then put it on the resume and then have a resume with lots of publications and presentations.

Kate
What were your papers on?

John C. Elsey
different things. One was on data compression for space missions. One was on almost like neural networks for space guidance. I can't remember.

Kate
Well, that's fine. Were they all...

John C. Elsey
[??] and filtering aspect, algorithm...

Kate
Were they all projects you were working on or were they just like things that you wanted to?

John C. Elsey
No, they were basically reports on the stuff we were doing.

Kate
that's really cool. What was your favorite project you ever worked on? like...or multiple like what were some of the favorite things that you were

John C. Elsey
And that's easy, I mean, the fingerprint identification stuff was my favorite. I enjoyed that one the most.

Kate
Wait, I don't know this. You worked on figure, like...

John C. Elsey
Fingerprint, yeah.

Kate
like things that they use all over today like fingerprint or at least...

John C. Elsey
Yeah, yeah. Computers were kind of coming on the scene. They started, well I guess started back in the 40s, some early ones, but they didn't really spread like they are today through the 60s, 70s... 80s was the first time I got a personal computer..

But they were coming on and doing a lot of things. And so the FBI and RCMP, Royal Canadian Mounted Police from Canada, were interested in automating a lot of their fingerprint stuff.

They would take fingerprints of people. There were two aspects. For identification, the police would often, you know, stop someone and they would fingerprint them, ink their ten fingers. And then they would send that card to the FBI in Washington with the intent of seeing if this person was really who he said he was, he got stopped for drunk driving, is he really wanted for homicide in some other place.

So they would fingerprint him, send the card to the FBI. And the FBI maintained.... I took a tour of the place. It

was incredibly big. Had about 4,000 people, spread over a couple of floors with all kinds of bins where the cards were kept.

And then they would get the cards in and then they had to sort through all these, I think they had like 20 million cards in their criminal files.

Kate
Holy Moley.

John C. Elsey
And they had a civil file as well with about as many. So they would get the card in, and then they would try and see if it matched any that were in their 20 million things, which is tedious. It would typically take a couple of weeks to push one through.

And by then, the guy that was arrested in Texas for drunk driving was on his way.

Kate
Yeah.

John C. Elsey
so they'd never know. So they wanted to computerize it to see if they could use a computer to match the fingerprints. So we worked on that and that was the most interesting thing. I was interested and worked on the algorithm that actually performed the match between the prints.

We used to extract what we call the minutiae, which were the endings and bifurcations of the little ridges on your fingers. I developed some, well, I really improved, I think, the algorithm and got a patent for it.

The only patent I got.

Kate
The "Only" patent I got. You got a patent, Grandpa, that's really cool.

John C. Elsey
Yeah, they used that, a lot of agencies used that algorithm. Remember we got, I saw a letter, there's a lot of police agencies that were interested in getting their own fingerprint besides the FBI and the Royal Canadian Mounted Police, both of which did buy systems.

I could go on and on about this with fingerprints.

Kate
Oh do!

John C. Elsey
I remember sitting with the FBI guys and also the RCMP guys, three or four of them from Scotland Yard came over as well from Britain. They put me in charge of the meetings and the work with Scotland Yard folks.

That was interesting. Three or four guys from England came. But they would ask how accurate is your system. We ran a lot of tests and that was what was fun about the fingerprint stuff is we could get cards from people.

It would run maybe a hundred people, maybe a thousand people, and run them through our reader and then

we have our own little database. Then they would bring other prints in and we would see if we could match them up with what they had.

You could tell what percent of the incoming cards you could correctly match with what you had in your database.

Kate
Yeah.

John C. Elsey
So it was a fun project that way. And we could do maybe... it depended a lot on the quality of the prints... we could do maybe 70, 80, maybe on a good set, 90% accuracy. So it was always funny. I'd ask the SBI guys, well, how well does your manual system do?

And they'd say, oh, it's good. And I said, well, how good? And they'd say, well, I don't know. Have you ever tested it? No. No, but it's good. And RCMP said exactly the same thing. Why don't you test your system?

And they'd say, no, it's good. It catches them. What RCMP motto was, "we always catch our man". And so they said, it's good. And I said, well, how good? Well, we don't know. Why don't you run a test? Well, we can't.

And I said, it'd be easy to do. They said, yeah, but anyway, we went back and forth like that for a while. And we knew we could only do 80% or 90%, depending on the cards. And these guys wanted their system.

But the results weren't 100%. So they'd bring us better fingerprint cards. And we'd run tests on those. They got better, but never got to 100%. And finally... well, a little short story... the FBI did run their tests, ran a manual test to see how good their system was.

And our computer system beat them every time. They were running about, I think, again, depending on the card, 60%, 70%. And we were running 80%, 90% kind of thing. And they would bring in two examiners to take their most experienced examiners to match the cards.

And we were still beating them. So I know we were better than the FBI. The RCMP, I asked them, I said, well, how did you do? And they said, we bought your system. They would not tell us what they had done, how well.

At least they didn't tell me what they had done. And I was intimately involved in that. That was really a fun project. We got a letter at one point that said from different agencies that said we've used your fingerprint system and identified 10,000 offenders.

I think something like that. Another way to use the system was to pick up what they call latent fingerprints. If you put your hands on a desk or a top, you'll leave a fingerprint. And at scenes of crimes or other places, they will dust that, pick that print up, and then try and match it against people in their database.

So the latent systems, again, it depended on your prints, but we were only getting 50%, 60% identification there. But this little letter said, in appreciation for a Printrak or for Rockwell's matcher that we've identified, 10,000 or some large number of informants.

And then the thing I did, and I got the patent on it, was I improved the matcher a lot. And there was a letter that came, and I wish I had a copy of it, written to the division there that said the R40, which is the one I developed, matcher is so much better than the R30 and we're getting hints where we did not get them before. So anyway, that made me feel good.

Kate
So was that a project you worked, how, like, was that a project you worked on? I'm assuming for a long time.

John C. Elsey
For several years, probably three or four years.

Kate
And did you do lots of like updates on it like yours like they said R30 and R40 or did you kind of like set it up and then let everybody else improve it like everything you've already done

John C. Elsey
Well, it was kind of interesting. Rockwell sold the business, so they went to another company and I did some consulting with them for a few years. We were working to improve it, but I don't know that we ever made a significant difference.

And I don't know what kind of matchers they're using now.

Kate
So you just changed the business and then moved on.

John C. Elsey
Well Rockwell was not making money. It was interesting. In the early days, we were talking with different agencies and they would ask lots of questions. They wanted improved performance. They wanted a better price.

They wanted this. They wanted that. And we were out to sell systems and make money as they do that. So I remember companies kept after us, agencies kept after us. And I was in Minnesota one time with the Minnesota folks who were one of the early customers.

And I just remember we were struggling because we couldn't sell the systems because they wanted other things and wanted add -ons or other. And I remember just talking to some of the guys. I was not in the management or not deciding when to sell or what.

But I just remember talking to a couple of the guys. I said, I think Rockwell was thinking of getting out of the business. They said, what? They are. I said, yeah. And they said, why? They said, we're not making money.

We can't sell the systems. They want too many things. And it seemed to me, and this may be my perception, from that point on, they got more cooperative. They weren't so demanding and we were sold some systems.

Kate
oh nice so you worked for the you worked for technically the same company but it did get bought out at some point or did you

John C. Elsey
That business was sold to another company.

Kate
Okay.

John C. Elsey
Rockwell sold it to the company.

Kate
I love that.
What was like your favorite and least favorite part of your, of your industry that you were a part of

John C. Elsey
Well, the favorite part that I worked on was the, uh, was the fingerprint stuff.

Kate
right was that it was your favorite part just like creating things and yeah perfecting them and stuff well not perfecting but improving...

John C. Elsey
about that career I always seem to find things to do and I often usually did it on my own I mean with the fingerprint stuff I was working on the algorithm to develop that to match the print so I used computer simulations and ideas and and so on that nobody was really telling me do this or do that I had I was going to work on the fingerprints so they left me alone you know for a couple years I was doing what I wanted to do what I thought would work I reported regularly to the supervision and other people on the results and I think that was that way most of my career I mean you say I'd work on re -entry guidance for the space shuttle and I built my own simulation did a lot of my own stuff there other things I was developing algorithms and I was pretty much doing it on my own nobody was telling me what to do... generally you knew what you had to do, what you wanted to do... but day to day, month to month, week to week I wasn't getting any supervision- I was doing what I wanted. That was really pretty nice - I could write computer programs and simulate things

Kate
So what was your like, what did you not like about, you liked the autonomy, I feel like, and then like, but what was something you really didn't like about your industry? Is there anything?

John C. Elsey
About the industry?

Kate
or just like, you know, engineering, like, there's a lot of great parts, but what were some of the some of the things that you weren't a big fan of?

John C. Elsey
Well, I did not like working with NASA, the National Aeronautics and Space Administration.

Kate
Really?

John C. Elsey
The space business is interesting because things happen way out in space and a thing goes wrong on a satellite or a missile. You can't really fix it out there. You've got to have it all worked out ahead of time and if you're not thinking about all the things you can have a problem.

Like at one point we had a missile intercept program where we were building an interceptor to go up and intercept ballistic missiles that were coming in. We had a test that was conducted. The Kwajalein Island in the

Pacific was where we would launch the interceptor and the US has a big base down there and a big lagoon and missiles splash into it.

They would fire missiles out of Vandenberg Air Force Base, Minuteman missiles and they would, well I guess, fire others as well. But these missiles would fly down and land in the lagoon 4 ,000 miles away and we would launch an interceptor from Kwajalein and I did not go to Kwajalein.

Some of the guys in the group did but I was listening to a feed on a test and the feed said okay they're launching the Minuteman missile from Vandenberg. They said yeah we've got launch okay the missiles on its way.

It takes about 30 minutes to get there and we launched the interceptor about halfway down about 15 minutes into that to go up and get it. And so 15 minutes came. They said we're launching the interceptor nothing happened and the interceptor did not launch.

Kate
Oh, no.

John C. Elsey
They figured out later, well, you're in a block house hundreds of yards away from where the missile is, because that could explode and you don't want to be there. So you're a few hundred... I was not there, but a few hundred yards away from where the missile was launched.

And they pushed the switch and nothing happened. And so they found out that one guy had forgotten to turn a switch that would allow transfer of power from the ground to the missile. And because of that switch was not set, that missile didn't launch.

Kate
Oh no.

John C. Elsey
But, you know, if your TV doesn't work, you turn it on and it doesn't, there's nothing there. You say, well, if it's plugged in, you go over and think, oh, it's not plugged in. So you plug it in, but you can't do that in space.

So space is tough because you have to take care of all the contingencies, be very careful... Whereas with the fingerprint stuff, they bring in the cards, you create a database, bring in the latent prints, you match them up, you're right there.

And you can see everything is going on. And so that was, and NASA was very political to me. That's a long story too- we won't go into that. But this politics and whatnot were something I did not like. Plus I had one supervisor who was pretty awful, but generally I had really good people to work with.

Almost always.

Kate
That's good. Let me see. Astronauts? You want me to ask you about astronauts?

John C. Elsey
Well, when I was working with NASA, we were on a program to evaluate reentry guidance systems or algorithms for the space shuttle, and Rockwell had an algorithm and MIT, Draper Labs. Draper Labs and MIT

were about the same.

And then NASA had an algorithm. So there were three that were kind of competing to be the algorithm. And I set up a committee to evaluate those three, and I was nominally in charge of the technical part of those three.

I didn't really... I had my own entry guidance system, but that was not a candidate. It was not that well developed. But so we had this committee, and we would have reports. We'd go to NASA in Houston from time to time, and we had an astronaut that was assigned to our committee.

He was a nice guy. I don't think it was one that you'd recognize. We'd go to lunch and eat, and he'd go to the gym and work out and come back. So I knew an astronaut there. I think... I don't know if I met Neil Armstrong or not.

Seems that's some... Anyway, there was a couple of astronauts around that we did meet with, and sat with.

Kate
that's cool. I like that. Let's see. I liked grandma's stories about you taking, taking a nap in your car just so you didn't fall asleep. Can you expound upon those stories?

John C. Elsey
Well, I'd take my lunch to work. Sometimes I went out with the guys and we had lunch, but generally I would take my own lunch and eat and then take a nap. Sometimes my lunch was a little longer than an hour, but at least I did not fall asleep in afternoon meetings like a lot of other people did.

Kate
Grandma was saying that they would fire people for that, and so it's dangerous.

John C. Elsey
They didn't then because there were people who were napping and they did not get fired. One funny thing, the supervisor, there were three of us in a meeting, he was giving the briefing and he was falling asleep, giving the briefing... oh my gosh!

Kate
Okay, so let's see, I mean is there anything else you want to add about your career and your experiences, or do you feel like we've covered it?

John C. Elsey
thinking about it I was I was really pretty fortunate because I said I was pretty much on my own I could do what I wanted to pursue my ideas and some of them worked out and some of them didn't... and I was pretty much... I did not have daily supervision or even weekly I'd make reports write reports but I was I was fortunate I was able to do a lot.... and I'm glad I had taught at the university I taught a class at MIT and the University of Illinois I taught classes and they were work in a way because you had to prepare, you had to prepare the presentation if you got a new class it was a lot of work as you had to prepare new stuff you're teaching the same thing you could go back over and use your previous material and it was okay but I like learning and I like teaching new classes because you learn new things but it was a lot of work

and had to present it with working as I did in the industry. I didn't have to teach classes, I could just work on new things and experiment with new things and learn new things. I was fortunate, I think, looking back, I was very fortunate in being able to do that for 35 years.

Kate
Did you ever become like a supervisor or manager or anything or did you just were you were you just building stuff the whole time? creating things

John C. Elsey
good question. Early on, I became the supervisor. I had a unit with five guys, all of which had PhDs except one, and he went on to get one. They were good guys. I enjoyed working with them, but I did not really like the supervision, because I had to be somewhat responsible for what they did, that it was okay or was correct or whatever.

It was so technical, and they were doing different things. I could never figure out totally what it was. I did not like the personnel stuff. They were good people. I did not really have any personal problems with them, but I decided I liked the technical work.

And Rockwell had two tracks. You could go up supervision, supervisor managers and whatnot, or you could be on technical staff and become a 1, 2, 3, 4, 5, 6, 7 technical levels. I was at the top technical level when I finished.

Kate
which is

John C. Elsey
It was somewhat unusual, I understand, but it seemed okay to me.

Kate
So you were much more hands-on than managing... your preference.

John C. Elsey
Yes.
I did have a lead on a couple of projects and that was kind of fun but that was because I could identify what we needed to do and then assign the different aspects of that to different people.

Kate
You actually knew what was going on.

John C. Elsey
Yeah, I knew. I knew what was going on.
It was the project I was working on. I was leading the team that were working on this, and that was good. We did a couple of good things there, I think.

Kate
I love that. That's so cool. All right. That's it. Anything else you want to add about your career?

John C. Elsey
Oh, there's 35 years there.

Kate
Yeah, that's a big, big part of your life. 35 years condensed into 35 minutes, it's kind of...

John C. Elsey

Well it was interesting when the company, the way the industry went, when I hired on it was North American Aviation and a few years later they merged with Rockwell because they wanted to not be so dependent on government contracts which were sporadic and so they merged with Rockwell and it became North American Rockwell and then I think Rockwell eased out all the North American executives and it became Rockwell and then later it was Rockwell International and then in the 1990s after the Cold War ended Boeing bought all the defense business from Rockwell.

So I worked for Boeing, I'm a retiree of Boeing although it was just the last couple of years.

Kate
which is a very recognizable name. So you just kind of weathered all of the management transitions and did your thing and let them figure it out. Did it ever really affect your work like on your level?

Or did you just kind of roll with roll with what was happening?

John C. Elsey
I was pretty much independent. I would be assigned to different groups to do different kinds of work. I did just one manager was really a bad taste in my mouth and I had problems there but turned out so did a lot of other people and he was soon gone.

He was off somewhere else.

Kate
Did... um... so obviously 35 years technology changed a lot during the course of your career right

John C. Elsey
Yes

Kate
...so was it pretty easy to like because i mean your career was technology and developing technology was it ever hard to like keep up... I mean this, this is kind of not doing you credit to ask this question whether it's hard to keep up or not, but like was there any any anything that popped up they were kind of like this is crazy is anything that kind of took you a bit to get used to or... I don't know if that question makes sense but I guess 35 years in technology is quite the span to see what how things developed and I.... and you weren't necessarily on like specific technology you were kind of in you're kind of touching everything right?

John C. Elsey
That's an interesting question.

Kate
It's complicated, I'm sorry I threw it at you.

John C. Elsey
thinking... I have some comments I can make. Computers were just coming in. I did not take any computer programming courses in school that I don't think any were offered. But I did love digital logic and felt comfortable with computers.

And I did pick up programming and did quite a bit of programming on my own for my own purposes. I didn't write any code that was used by the company, and I don't think. Well, that's not totally true.

I developed some things which other people put in the code, I guess. And I enjoyed programming. I enjoyed writing code that solved problems with simulate missile launches and intercepts and that kind of stuff.

That was really quite interesting.

Oh...It was one time... I was gonna say... I forgot what it was.

Kate
That's fine, so it didn't affect your work, but it didn't necessarily like overtake your work.

John C. Elsey
I know what it was, okay. Yeah, for one thing, it was just interesting to me. When we were doing the fingerprint work, we needed to store a lot of data, fingerprints, with millions of them, and so we needed memory, and we would get these biggest units at the time which were washing machine size.

They had big platters, like record player discs, except they were 14 inch or so, and there were a stack of antennas in a stack, and they could be replaced. You'd lifted the lid off the machine and put this stack of stuff in there and it spun the things up, and it was spinning discs that had the data on it, and that washing machine size, biggest you could get at the time, had 88 megabytes of storage.

And now, you look at these phones that you put in your pocket, and they got little chips with gigabytes on them. So, I don't know what the industry is like today as far as the fingerprints go. I understand the FBI uses computerized fingerprints all the time now, and probably a lot of other agencies do.

So, the areas full of washing machine size stuff is now tiny chips that hold all the data. That was an interesting thing.

Kate
I guess it's cool this it's cool that you were there like to see the origins of things and then to kind of watch it...

John C. Elsey
Uh -huh

Kate
...watch it grow. That's that's really cool

John C. Elsey
Yeah.

Kate
I like it. You good?

John C. Elsey
Yep.