NASA HEADQUARTERS NACA ORAL HISTORY PROJECT
EDITED ORAL HISTORY TRANSCRIPT

JAY E. STONE
INTERVIEWED BY REBECCA WRIGHT
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WRIGHT: Today is July 18, 2014. This oral history session is being conducted with Jay Stone at his home in Palo Alto, California, as part of the NACA [National Advisory Committee for Aeronautics] Oral History Project, sponsored by the NASA Headquarters History Office. Interviewer is Rebecca Wright, assisted by Sandra Johnson, and we thank you for letting us come to your home today and visit with you here.

STONE: It's a pleasure.

WRIGHT: We'd like to start by asking you if you would share with us a little bit about your background and how you became part of the NACA.

STONE: My college training involved the University of Washington in Seattle, and that was electrical engineering. After that, I took a master's at UC [University of California] Berkeley in electrical engineering. That was 1948, I got out. They were hiring at Ames [Research Center, Moffett Field, California]—Ames was the only place hiring engineers, and so, that's where I ended up. I was there two years.

WRIGHT: What did you want to do with your electrical engineering degree? Why did you choose to go into that field?

STONE: I wanted to learn technical things. I wanted to have a good, steady job. That's primary.

WRIGHT: You started, you said, at Ames in 1948. Tell us what you did on your first job and your first task when you were out there.

STONE: My first job that I recall was Ames had a project where they were hauling a so-called spaceship, but it was just a dummy, up and then letting it drop. I was an instrumentation engineer, so I designed an accelerometer to measure when it hit the ground, what the deceleration was like. It was a little instrument that would make that measurement.

WRIGHT: Who were you working with at that time? Do you remember who your boss was?

STONE: Sure. His name was Taft Wrathall, and I worked with Rudy Schubert [phonetic], and Howard [W.] Kirschbaum was the head of the group; it was instrumentation. Taft was the assistant.

WRIGHT: In '48, Ames was still pretty new at that time. I think in 1940, I believe, was when it opened up.

STONE: It was an established facility, and they had wind tunnels. You'd get awakened in the middle of the night by this blast because they took so much power that you couldn't run them

during the day—they had to run them at night. You'd hear, out of the clear sky, "Whoo..." That was the 40 x 80 Wind Tunnel, which is the big one. It's still around, I'm sure.

WRIGHT: Did you live close by?

STONE: Yes. I was just married at that point, and so we lived not far away.

WRIGHT: Did they have housing for you out at the laboratory, or did you live outside the gate, out that way?

STONE: Right.

WRIGHT: How long were you in the instrumentation division?

STONE: All the time I was there, and that was two years.

WRIGHT: Can you tell me a little more about you said you had the spaceship, but not really a spaceship?

STONE: That was a small project. My other project, which I had probably for about a year, involved an analog computer. In those days, there were propeller-driven aircraft, and ice would build up on the propeller. They had heaters, so they had to measure what the most efficient cycles of heating were to get the ice to melt off of the airplane propellers. That had commercial

applications. When I said it was a computer, analog computer, they called it the glass monster. It was on big sheets of clear plastic, and we had all the electric circuitry, you drilled holes in it and the circuitry was all laid out so you could see it. That was a sizable project.

WRIGHT: Did you only use one type of propeller, or did you have different ones that you used?

STONE: No, it was a generic propeller, I think you might say. We were under contract to the flight research group, and they were the ones that wanted this information, so they had us do this job.

WRIGHT: Were you working a lot at night?

STONE: No.

WRIGHT: You had the day shift, pretty much, as a junior engineer?

STONE: I never worked at night.

WRIGHT: That was a good thing.

STONE: Right. I had a roommate who was in the 40 x 80, and he did some night work.

WRIGHT: Why did the project take you a year? Why did it take so long? Did you finish the project before you left?

STONE: You had to build the system and then, I don't think anything had been done like this before, and we'd get requests for data, data on certain tests, from flight research, and then give them the data.

WRIGHT: Was it a constant project every day that you worked on, or did you help design it as well?

STONE: Yes.

WRIGHT: Where were you housed? What area at the Center? Were you near the big wind tunnels?

STONE: No. That's a long time ago—I couldn't tell you the layout. We were closer to the entrance than the 40 x 80. Most of the wind tunnels were towards the rear, and the engineering stuff was closer to the entrance.

WRIGHT: Were there new people coming in those two years that you were there? Were there lots of new people?

STONE: Not too many. Maybe four or five new engineers, something like that.

WRIGHT: I guess it's good that you got hired when you did. Did they start slacking off, some?

STONE: This is before there was an electronics area around here, and so there really weren't any other people hiring electrical engineers. Yes, it was good that I got in there because that's about all.

WRIGHT: You said you left—why did you decide to leave NACA?

STONE: The field that I was in was servomechanisms. I had studied that in school. There was a fellow who was pretty prominent in the field, who worked for Sperry Gyroscope in New York. You're young, you can move around, so I took a job with him.

WRIGHT: You went from one coast to the other, didn't you?

STONE: Right. I'd never been east, and Carole [Stone] had been to New York, and she liked the east, and so it just sounded like something to do.

WRIGHT: What part of New York was it in?

STONE: On Long Island.

WRIGHT: Right in the heart, okay. How long were you with Sperry?

STONE: Two more years—well, no, four more years, but two years—I didn't like New York. I couldn't stand it. Sperry had a facility in Point Mugu—Point Mugu in Southern California, at Oxnard—they had Oxnard Air Force Base. I had been working on a missile program at Sperry in New York, and so, when I went west, I took the prototypes. They sent them out there, and then I was able to work on it out there. I got back to the West Coast. We lived for two years in Oxnard, then I took another job. Then, I went into sales and I was in electronic sales for several years. The electronics industry was growing at this time, and it was just springing up. Hewlett-Packard was the big one.

WRIGHT: This is in the mid-1950s or late '50s, about that time period?

STONE: Yes.

WRIGHT: You were still in the Palo Alto area, give or take? Or further south?

STONE: After a couple of years, I took a job in selling. We were living in Los Angeles. I took another job, after two years, and we moved to Northern California. I was selling around the area, these were electronic things, and then I eventually started my own business and had that for about 30 years, my own selling business, manufacturer's rep [representative], selling electronic items. Then, I retired.

WRIGHT: That's a lot of miles.

STONE: Right, but it was fun.

WRIGHT: Did you end up selling products to Ames or the contractors?

STONE: No. Most of the products I was handling were in the microwave field. "Microwave" being not commercial, but mostly communications stuff.

WRIGHT: Kind of like the telecommunications?

STONE: Sure.

WRIGHT: That makes sense, all right. Do you have other memories or associations, working with the Ames group? I notice you have some clippings, there. Are there some things that you wanted to share with us?

STONE: I just clipped this article, it happened to be in the paper. I don't think there was any questions that I had, but if you just want to know some recollections of things from Ames?

WRIGHT: Sure, I'd love to.

STONE: Mountain View and Palo Alto were little towns, small towns, and we'd go out and have lunch in those little towns. There was a large Hispanic population. We had a lot of Mexican food. You've got give me a little time to think about it.

Some of the people that I worked with started their own companies. Harold Harrison started an electronics company and it became quite large, about 500 people. We stayed friends. John Dimeff was a physicist. Harry [J.] DeVoto was the artist, all the drawings and that sort of thing, but he also was a great artist.

WRIGHT: Did you work with Harry on any of the designs for anything that you worked on?

STONE: I don't think so.

WRIGHT: You were telling me about Jack [John V.] Foster. You said he was associated with something in space?

STONE: He had a project, it was a spaceship that went out from the Earth and it just kept going and going and going, and 15-20 years later, it was still sending back signals [Pioneer Project]. They have it back in the space museum back in Washington, DC. It was an amazing program. It didn't get much publicity, but here it was, after 30 years in one direction, sending signals back. That's pretty amazing.

WRIGHT: Now, so many of us think that's a common thing, but it certainly wasn't common back when you were out there.

STONE: No.

WRIGHT: You were telling me about Palo Alto and Mountain View when they were a small town. Was it a good place to live? Mountain View?

STONE: Absolutely.

WRIGHT: It's changed a lot, since you first lived in Mountain View?

STONE: Sure. Lots of people, now. There weren't many. There was maybe two or three restaurants in Mountain View, and now there's probably 50. Palo Alto's the same way. There just weren't people.

WRIGHT: When you came from University of Washington down here, did you stay in a house, like a rooming, board house?

STONE: I roomed with another fellow and we had a room in somebody's home, yes. His name was Merritt Oldacre [phonetic], and he was in the 40 x 80 Wind Tunnel.

WRIGHT: He's the one that had to work at night, you were telling me.

STONE: He had some. When we both applied for work, we met each other, and we said, "What about getting a room together," and we did, a couple of years.

WRIGHT: Did you ride a bicycle to work or did one of you have a car? Do you remember how you got to work?

STONE: We probably had a ride pool.

WRIGHT: That would be good—that's a pretty long walk.

STONE: Yes, I think that's what we had. I wish I had more to tell you, but as you get older, your memory fades.

WRIGHT: Sure, and so much was changing, then. Was that considered a new field of what you were working on when you came to work at Ames as an electrical engineer? You mentioned you were working with the glass monster. Could you tell us a little bit more about that?

STONE: There weren't any computers, per se. Nothing. This was just a machine that would sort of simulate what you were trying to get information on. You built a machine that simulated it, and it'd give you the answers.

WRIGHT: Had you worked with any type of those computers at the university, or was this the first one that you had worked with?

STONE: No, I didn't work on any university.

WRIGHT: It was new for you, that's good. Did you have something you want to ask? I think Sandra has a question for you.

JOHNSON: Did they provide any training classes for you when you first got here that you remember?

STONE: No, no training classes.

JOHNSON: You don't remember going to any kind of formalized training, and was the idea that you were learning from the men above you, and they served as your mentors as you learned to do these different projects?

STONE: No, I didn't report to somebody who I learned things from. They just more or less doled out jobs, and we did what we could. It was a new field.

JOHNSON: You mentioned the servomechanisms. A couple of other people have mentioned them, but do you want to explain what that is?

STONE: Say you've got your arm, and you put things on your arm that make it so much stronger, a super arm. This would be you move your fingers and you're moving very hard things to move.

When you put a little pressure on something, it makes the machinery so that you can move something that's very heavy. It tracks where you want to move it. It lightens your job, so you have to have sensors, measuring things, and then amplifiers telling—just putting out your arm like this, if you had a monstrously heavy arm and you could hardly support it, you would have a sensor telling you, you wanted to move but you couldn't move it, so that sensor had to go into an amplifier, something with a big electric motor being run from the amplifier. If you moved it just a little ways, the motor would move exactly the same amount. Then, if you moved it a lot, the motor would move a lot. You could move something very heavy, very precisely.

JOHNSON: I know they were working on that at NACA—did you have any involvement with the servomechanisms when you were with NACA?

STONE: I did some work in school on them, and so, that was the field I generally had interest in. As I say, when I went to Sperry, they had this missile program, but it used a lot of these principles of servos.

JOHNSON: Were you aware of what they were doing at NACA with the servos?

STONE: Sure.

JOHNSON: You wanted to move on from NACA at that point, okay.

They were having inspections, I think, every three years at the different Centers. They would go from Langley [Research Center, Hampton, Virginia] and Ames and Lewis [Research

Center, Cleveland, Ohio, now Glenn Research Center]. Do you remember any of those, like, in those couple of years you were there?

STONE: What do you mean by an inspection?

JOHNSON: Where people from the other Centers would come in and then everybody would present papers on what they were working on. Do you have any recollections of that happening?

STONE: I don't think they did any of that when I was there. I don't recall it at all.

JOHNSON: What about social activities onsite? Any athletic groups?

STONE: On our own, if we had a ball team or played something like that. I don't remember any ball teams.

WRIGHT: How did you and your wife meet?

STONE: We met on a blind date. She was with somebody else and I was with somebody else. Are you listening?

C. STONE: Yes.

STONE: Am I telling it right?

C. STONE: Yes.

STONE: Then our first three dates were on skis. We both liked to ski, and we did a lot of that during our married life, too, skiing. I don't know—we hit it off.

WRIGHT: I guess so, you've been together for how long?

STONE: Almost 64 [years].

WRIGHT: Long time. Lot of places.

STONE: Seems like only yesterday.

WRIGHT: I'm glad to hear that.

JOHNSON: Were you involved at all in writing any reports on what you were working on? The NACA had the technical memorandums and the technical reports?

STONE: Yes, we had to write reports to the people, the flight research group that we were working for. The fellow's name that I reported to, his name was—he had a strange name. His first name was Carr and his last name was Neel [Carr B. Neel].

JOHNSON: Yes, we heard someone mention him today.

STONE: Is he still around, do you think?

WRIGHT: Don't think so.

JOHNSON: I don't think so.

WRIGHT: What were the results? Did you get to finish that project before you left, the de-icing project you were working on?

STONE: No, I think it was just a continual thing. It was something you keep making measurements on, you build them equipment, then you keep checking it out. I didn't work with the engineer, per se. I built the equipment to make his measurements, but he was working with the aircraft manufacturers about de-icing on the propellers, and I didn't get in, in that part of it.

WRIGHT: When you were in school, did you have projects where you had to build different types of tools? What did you learn out of school, or what did you take in school that helped you be ready to do that job?

STONE: Courses in servomechanisms.

WRIGHT: Your master's, you said, was in electrical engineering as well?

STONE: Yes. Right, solid state, it was just coming into its own, in those days. In fact, the term "solid state" wasn't even around.

WRIGHT: You were in a very evolving field for many years. I guess your sales job was always trying to catch up or be up to date with the latest products?

STONE: As a representative, you represent different companies. You have maybe 10 companies you represent and you go in and talk to somebody, and he could buy something from two or three of the companies. You work with him and get him in liaison with the company.

WRIGHT: Did your background as an engineer come in handy in that job?

STONE: Sure.

WRIGHT: Why did you choose Palo Alto to come back to, to live?

STONE: Good place to live.

WRIGHT: It is nice.

STONE: When we came back, Hewlett-Packard and such companies similar, there were many—Ampex—just a flock of them. It was just a good place for an engineer to be. Just as an aside, I

actually started in school in the journalism school, and I was going to be a sportswriter. But, I was in the Naval ROTC and the captain said, "Maybe you better get a little more technical in your course," so I started taking some electrical engineering courses. It's a strange twist, but I had to do something.

WRIGHT: Yes, but it worked out well. If you were good with words, and it helped you be good with sales, so that's helpful. Speaking of the products that you represented, is there some that come to mind as being kind of more memorable than others?

STONE: Yes. One of the companies, AirTEC [phonetic], built some special amplifiers that were used in the first Moon shot. They were selling to somebody else, who was putting them in the equipment.

WRIGHT: There's always the discussion of how small, but how powerful the products were, and then, of course, how not powerful they are compared to what we have now. The transistors, and those types of products that were used for the Apollo Program and the space program.

STONE: I'll tell you something interesting—I was working at Ames and I received in the mail from one of the big companies in the east, a little package. It said, "This is called a transistor. Would you try it out?" They gave it to me because I was one of the junior engineers. They gave it out to try it out, and I couldn't get it to work. I never thought it had any future.

WRIGHT: It did, didn't it?

STONE: It sure did.

WRIGHT: Do you remember other products? Did you represent Hewlett-Packard as well?

STONE: No, I didn't. I sold to them. They were one of our biggest customers, yes.

WRIGHT: That's a good one to have.

STONE: Sure.

JOHNSON: Do you remember when Sputnik [Russian satellite] happened in '57? Just the feeling in how the U.S. was moving more towards rocket and spaceflight at that point? Did you ever think about coming back to someplace like Ames, or work for NASA?

STONE: No. I think at that point, I was in sales, and I didn't want to go back into engineering because sales was very interesting and had a lot more future to it.

WRIGHT: Met lots of people in your job, didn't you?

STONE: Oh, boy, I'll say.

WRIGHT: Some of the people that you worked with, you said they had started their own businesses. Did you have dealings with them, or did they have a business that you could sell to?

STONE: All those things. One of the fellows I knew at Ames was the one that started this business called AirTEC. I became his representative in the area, and it became my biggest seller. They were the ones making these amplifiers that went to the Moon shot. It all sort of ties together.

WRIGHT: It does, yes. Good friendships that started.

JOHNSON: Are you involved with the alumni group for the NACA?

STONE: No, but I'll tell you one thing I did do that involved, I guess it may have been NASA by then. They had a group that took classes of young kids, maybe fourth, fifth, sixth graders, and Ames had a simulator. Does this ring a bell?

WRIGHT: I know they had simulators.

STONE: They simulated a spaceship, so you bring these kids in, and there's different stations in there. Here's this kid that sits down at the station, and he has a computer there, and you say, "Okay, you're in a spaceship and you're observing forest fires down on the ground, and you can tell how hot it is by the color of the fire." Then, you can tell space control what's happening, are the fires burning brighter on the north side? Here's fourth and fifth graders with this job to do,

and they're looking at the computer screen and telling the captain of their spaceship, and he's another kid, fourth grader or fifth grader who's the captain of the spaceship, and he's telling somebody else down on the Earth. The kids just loved it.

WRIGHT: Did you help with those groups?

STONE: I was one of the workers, but then they cut the program off. They said they didn't have the money, and it was a shame. The teachers would bring the classes in.

WRIGHT: They learned a lot, didn't they, just by being exposed?

STONE: They just loved it.

WRIGHT: Have you ever been back out to Ames, other than that then working with those groups?

STONE: No.

WRIGHT: That was it?

STONE: No, I haven't.

WRIGHT: It's changed again.

STONE: I'm sure it has.

WRIGHT: It's getting ready to celebrate its 75th anniversary, so they'll have an open house, maybe you'll have a chance to go take a ride out there.

STONE: When is that?

WRIGHT: October, I believe they said. I haven't heard the whole date, but if I find out, I'll send you an email. I won't be here, but you can go and you can tell us about it.

Is there anything else you can think of?

STONE: I don't think so. Everything contributes, I guess.

WRIGHT: It does because I've never heard about the glass monster before. That was pretty neat, and about the whole electronics side. We hadn't heard too much about that, either. I think Mr. [Smith J.]DeFrance was the Director—did you ever have any dealings with him, or ever meet him?

STONE: Not personally. I tried to stay away. He was the boss. Smith J. DeFrance.

WRIGHT: That's a name, isn't it?

STONE: Yes.

WRIGHT: That sounds like a boss's name. When we send you the transcript, if you think of something else, then we can add it in.

STONE: Great.

WRIGHT: All right. Thank you.

[End of interview]