NASA SANTA SUSANA FIELD LABORATORY ORAL HISTORY PROJECT
EDITED ORAL HISTORY TRANSCRIPT

DONALD HEIM
INTERVIEWED BY JOY D. FERRY
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FERRY: I'm Joy Ferry, today is July 29th, 2015, at 1:30 pm, and I am interviewing Donald Heim. And I have your permission to record this interview?

HEIM: You certainly do.

FERRY: Alright. So how about we start at the beginning of your career, and how you made the transition straight from Purdue to working at Rocketdyne?

HEIM: Well, that's a little bit interesting. In my senior year at Purdue, I had already married my wife for a year, and had six job offers. I narrowed it down to two: one was from Rocketdyne, Santa Susana, and one was Hartford Connecticut, with Hamilton Standard. Same job, one is rocket engines, and the other is jet engines. And we couldn't make up our minds. So it was pouring down rain, and we said, "Let's look up the rainfall. Okay, we're going to California." So I came up here. Oh, and incidentally, as soon as I had accepted Rocketdyne's offer, they hired my wife, who was a chemist, down in the Materials Lab at Canoga Park.

But I came up here, and was in the instrumentation group. It had a couple sections at that time, it was about within a year it was 249 people, just in instrumentation. And it was a very

congenial, friendly group. I was assigned to flow measurements, and to time. There were four of us. The engineer in charge was such a wonderful person, he took us – me and my wife – under his wings, and we've been friends ever since. I'm still friends with his wife; he died about ten years ago.

But so I was working in instrumentation here, and after three or four years I had asked my supervisors that I'd like to expand into temperature measurements. Well, next thing I knew, I was in charge of temperature too. And then shortly after that, as an interesting thing, Air Force people came through our Standards Lab. And we did a helium mass spectrometry to look for leaks in things. And they asked, "How does a mass spectrometer work?" Well the engineer in charge of the lab says, "Well, I don't really know, well you use some helium." I just happened to be standing there, and being a physics major, you know a lot of things. So I explained to them how a mass spectrometer works. Well, the next thing you knew, I was engineer in charge of the Standards Lab.

And I branched out into many other areas of instrumentation. And eventually I became a project engineer, and then I became a manager, and then a process leader, and a few years after that, I retired. That's kind of my career there in a summary. But our group supported tests everywhere. We had a development lab, an instrument lab, a certification lab, and a lot of people. And we were an instrumentation group – the test areas themselves had their own instrumentation engineering technicians. So we would more-or-less supply them with what they needed, tell them how to make the measurements, but they actually installed things. So in that sense, we supported all of Santa Susana, a little bit of Canoga Park, we supported measurements up at Edwards Air

Forces Base, and we also, after the Space Shuttle got all moved to Stennis Space Center, we supported Stennis Space Center. I made a lot of trips to Stennis.

FERRY: So about how many people were working with you in the instrumentation group?

HEIM: At our heyday, there were 249. I've got the 1965 phone book at home, and I've counted them up. There were different groups: systems instrumentation, electronics instrumentation, and transducer instrumentation, instrument lab technicians, development lab technicians, certification lab technicians, put all together. And then unfortunately, when the moon program ended, 249 people went down to about 22. And then a shuttle came along, and then we got up, but never to the place that we originally were.

That's one of the things that – I grew up on a farm, and had fields, and trees, and a river, and all that. And so I just loved coming up here with this environment, and it also was not as political up here as it was down at the flatlands.

FERRY: So did you work out at any of the test stands? Did you do anything at the test stands?

HEIM: The only thing I did was when we calibrated the large propellant tanks, because our instrument lab did the calibration. And I had a lot of involvement in that. In fact, it's really exciting to climb up the ladder to some of those really tall tanks and be on top.

FERRY: I bet it would be. So you were in charge of instrumentation, temperature, and the laboratory-

HEIM: At various points in time I had flow measurements, temperature measurements, calibration systems, pressure measurements, a lot of involvement with vibration measurements. Particularly in the days of the Shuttle, that was very important. If something starts coming apart, you've got to protect it from vibration in milliseconds, and stop the test.

FERRY: So what was the most challenging part of that?

HEIM: The most challenging part was back at Stennis Space Center, the first time they did the big Shuttle system test, and they had all the congressmen there and everything, and it went [vvvvvt]. And it turned out that the accelerometers had been – all the connectors were smashed together, and they were cross-talking, so it cut the test. And that was not our job to do that, that was their job. And the ensuing things after that were challenging.

FERRY: So where did the majority of your work take place? Where you guys were situated out here, in the Santa Susana Field Laboratory.

HEIM: Right. The first place I worked was – I forget if it's 211 or 201 – it the one that hangs out over Simi Valley. And that was neat, because on a clear day, you could see the ocean. Then we moved over to 436 over here, which is no longer there. And then we moved back to the building across the street, where I was originally. And then we moved back to 436. And then we moved into a building which was right down here, 324. And that was the engineers, and the technicians, and everything, were all co-located in one building. And I retired from that building.

FERRY: That sounds like a pretty tight-knit group then, you guys were all smashed together in there?

HEIM: Yeah, we had a raised floor area, which used to have the computers and tape recorders, back in the days when they were so hot they had to blow stuff up, that's where the engineers sat. And then there was another couple rooms where the technicians and all the equipment was.

FERRY: So what do you remember most about working here? Do you have any memories that really stand out?

HEIM: Yes, the terrain, the isolation, and mainly the people. Plus, we were right on the forefront. Back in the 60's there weren't a lot of transducer manufacturers, and we designed and built our own stuff a lot of times. We had the support of a machine shop, and a weld shop, we had draftsmen. We did a lot of stuff, even up into Shuttle days, I was designing some things.

FERRY: So when you were talking about how you had to decide between the two jobs, and you made your decision based on the rainfall [laughter], the Lunar Program didn't have anything to do with your decision?

HEIM: No, because I didn't know that much about it. I knew that it was going on, I didn't really know other than that they were testing rocket engines here. But that's mostly what I was working on, were the engines for the Saturn Program, for the moon launch. It went from Saturn I up to Saturn V, which finally put them on. And I'm sure you know that we built the five engines, big F-1's, that's why I would go up to Edwards Air Force Base, for the first stage. And the five J2's for the second stage, one J2 for the third stage, and then we had an SDL-4, all these little tiny engines that were on the Apollo Capsule, and Gemini before that. Just to do the attitude - to keep it where it's to go. And those were interesting to hear when they did the systems testing in the

end, because they'd have the whole thing, and they were doing a systems test. And these things only go for like a couple milliseconds, so it was like a popcorn machine – pop-pop-pop-pop [laughter].

Another interesting thing that I remember was out at Coco when we did the full five engine J2 testing, and when they would run that thing up in the air, it was called Mach diamonds, and you would see it up in the air.

FERRY: Yeah, we actually interviewed someone who had taken a photograph of the Mach diamonds.

HEIM: Well, we were allowed to have cameras. Another interesting thing is there's some observation areas, if you wanted to go watch a test. And the sound is so strong, that you'd sit there, and just the sound waves your shirt would go like this [rumples shirt].

FERRY: Inside of the observation area?

HEIM: No this is like out in bleachers.

FERRY: Oh, okay. I knew that they had bunkers, but I didn't know that they had bleachers.

HEIM: Oh yeah, the control centers are sort of like bunkers. It's where all the recording equipment is. And our instrumentation group did the procurement, and service, and calibration, and everything on those instruments also. And the computers, and all of that stuff.

FERRY: So did you notice any of the buildings changing while you were here? Were things demolished, new things built?

HEIM: I noticed we had buildings being torn down occasionally. And the big brick building, 436, was built after I came. It originally was for our space division, when they were putting together this five engine J2 test series. And the total development of shuttle engines was done right here. We had 320 tests over many years, developing that. Starting out in little steps, until it's a total engine system. And then when it went into production it was sent to Stennis Space Center. And when you ask about challenging things, that had some challenges, because of the super high pressures that were in it, many times any of the other rocket engines we dealt with.

FERRY: Do you have any particular memories associated with any of those experiences?

HEIM: Well, not really particular ones. Just, I enjoyed working here. I do have a different kind of memories. I enjoyed the hikes through the hills at lunchtime. And I guess just being here, and doing this exciting job.

FERRY: So you guys went on hikes during your lunch hour?

HEIM: Yeah, a lot of us did. I remember we used to, in the 60s, go out on hikes, and I'd see these horned toads. And I haven't seen them in I don't know when, and when I was checking in I saw that they had a picture there on that counter when you check in, and it showed a horned toad, said they're an endangered species now. There was another time when it was after work, and somebody was going out and a rattlesnake was coming in, and they slammed the door, and the snake was half-in and half-out [laughter]. Which brings up another thing, in 436 over here, we

had a big Xerox machine in the lobby, and it crapped out one time. And when the technician got into it, he found that a rattlesnake had crawled up into it because of the heat, and jammed it [laughter].

FERRY: That would be pretty scary, at least for the technician. So, once you learned more about the Lunar Program and what you were involved in, how did that feel to be part of that?

HEIM: Well, I enjoyed it. I really enjoyed it. Everything was on the forefront. It wasn't like at the other company we would be working with jet engines that had been around forever. And everything was different, every engine was different.

FERRY: We were talking about your Russian language learning earlier…

HEIM: Oh, yeah.

FERRY: Did you get a chance to apply that in your job here?

HEIM: No.

FERRY: No?

HEIM: No. I took it in college for two years, and that's a story. Because when I decided to major in physics in the end, Sputnik had gone up, and Russia had kind of embarrassed us because they were in space. And so if you were in physics at Purdue University, you took two years of Russian. Turned out to be my favorite course, took two more at UCLA in the 70s, and took another two about three, four years ago.

FERRY: Are there any things that you would like people to know or remember about the work that you were a part of here at the Santa Susana Field Laboratory?

HEIM: Like I said before, I want them to know that this place was on the forefront, everything was new, everything was exciting. There's always days when things aren't so exciting, but everything was different all the time. It wasn't like a normal job where you're just doing the same old thing. Plus you deal with all the – we dealt with all the test areas, and all these other facilities, so we had lots of contacts, and lots of travel back and forth. Which is, that's one of the things that I do remember, it was impressive, probably around 1964, at Edwards on the high pressure F-1 stand. We had a big 14-inch flow meter, and the rotor on it was starting to develop cracks. And if that comes apart you would have blown up the test stand. So every weekend I was sent up to Edwards to oversee pulling that out of the stand, taking it apart, dye penetrant testing it to see if there's cracks, and put it back together saying "Okay, you're good for another week." And one time, there were cracks. And I said, "You can't test." And the head of Edwards who was at that time kind of a bull in a China shop, practically grabbed me by the scruff of the neck, took me in, and said, "You call your boss and tell him I can't test." So I called my boss and said, "They can't test." He says "Good. They can't test."

FERRY: I think the buildings, or the test stands, are part of a registered Historic District now, because it was such a momentous time in United States history?

HEIM: I know they're not being torn down at the moment. I think that's a moratorium until they find out if they can make it into something. Unfortunately, the oldest test stand was torn down right away, and that was VTS-1 out at the Bowl Area.

FERRY: Did you work out at that one?

HEIM: Actually the first job I had in the instrumentation group was to measure seal leakage on the hydrogen lines on the J2 engine. And that was being tested out at the Bowl. Like I said, we would tell the people what to do, and how to do it, and the people out there would install it and record it. I think I had the most involvement with, and would probably be the best thing to preserve would be the Coca Test Stand. Our group had lots of involvement in that. And people nowadays, since that was the development of the Shuttle engine, they would understand and relate to that more than Alpha or something that mostly was Atlas and Delta, which they put satellites and all that good stuff. But I think people today would associate with Coca more than anything.

FERRY: Yeah, people were very fond of the Shuttle Program, very sad when it ended.

HEIM: Yeah, that is true. And that being a hydrogen engine is kind of impressive too, because as opposed to Atlas and Delta that were on kerosene and liquid oxygen, which has a big bright flame, the hydrogen burns and it's almost invisible, it's kind of a bluish cast to it.

FERRY: Is that the one that has the Mach diamonds?

HEIM: Yeah. That was when they tested five of them all at once in the cluster that was on the second stage of Saturn.

FERRY: Out at Coca?

HEIM: Yeah.

FERRY: And you were there and you watched that test?

HEIM: Oh yeah, very interesting.

FERRY: Do you have anything else you'd like to add?

HEIM: No, not particularly [laughter]. Do you have anything else that you want to ask?

FERRY: I think we got some good information.

MANES: I was going to ask a follow-up question to – you had mentioned that they would have bleachers and you would go out and watch the launches, the tests. Was that something that everybody did?

HEIM: No, no. There were a lot of people that would go out and watch, but I wouldn't say that it's – certainly not everybody. And I've seen tests at Edwards Air Force Base on that F-1 engine, and that's more than a half million pounds thrust, and that is impressive.

VIDEOGRAPHER: I was kind of curious, I've always been so impressed with the Saturn rocket, and now when we're rethinking how to go to the planets the problem is there's not a lot of engineers around that know how to build engines that big anymore.

HEIM: [laughter] That's true.

VIDEOGRAPHER: I was curious, how do you look at that engine and its development, historically speaking?

HEIM: The F-1 engines? I don't know, we didn't test them here, we tested them at Edwards. What we did out at Bravo was test the turbo machinery, that pumps the propellants to the engine up there. And that was quite impressive, if they tested at night, they burned kerosene and oxygen to spin the turbines, and then that went up in an exhaust stack that was probably about 50 feet in the air. And from down in the Valley, you would hear this big whine, and the whole sky would light up, because they are blowing the fire up.

FERRY: Someone else we were interviewing was talking about those tests, and how people around here were convinced that it was UFOs.

HEIM: Oh, I've heard all kinds of stories about we're launching "things," and whatever. I used to lead tours up here, bus tours for the public, and you'd be surprised at how many things people think is going on up here that isn't.

FERRY: Did you lead the bus tours when you were working here, or after you retired?

HEIM: Yeah, when I was working here. On Saturdays.

FERRY: Was that part of your role here?

HEIM: There were probably half a dozen of us, and I had one person from over at E-Tech, and I would lead it going through the rocket site, and then they'd take over and tell them about E-Tech.

FERRY: I didn't know that they did bus tours while they were developing; I thought that they did that afterwards.

HEIM: Well, this was after the concern with groundwater pollution and things, and they wanted the public to get more familiar, and understand what's really going on. And show them the purification stuff we've got going on. And give them a history, as we went from test area to test area. A little bit of a history of what was done there.

FERRY: So that was after the Lunar Program?

HEIM: I'm guessing that was mid-80s. They're still giving bus tours; I went on one last year.

FERRY: And then the Peacekeeper, was that up here?

HEIM: Yes, in fact we also loaded the fourth stage on Peacekeeper out at – they turned the Delta 4, the Delta control center, into a propellant load facility for the fourth stage in Peacekeeper. That was another thing that we were involved in. And yeah, that kind of stuff was classified. And we had a lot of laser work also, and a lot of that was really highly classified.

MANES: I was going to ask one more question. Talking about the community, if you were doing tours, but even now, what do you think the view of Santa Susana is as a whole in the community?

HEIM: I don't ask that much, I don't get that much feedback. But I know some people think – I once had a neighbor, when they found out I worked up there, they said "Oh you poor man, I feel so sorry for you." But what I tell them now, is if they say something, "Just come to our retiree's breakfasts. You'll see a lot of old folks that aren't dying of cancer." I never was concerned about pollution up here; I didn't feel like it was that big of an issue.

(End of interview)