

8-19-2015

## Interview with Robert Lawton

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**File Name: 0903151121\_Robert\_Lawton.mp3**

**File Length: 0:50:25**

**[START OF TRANSCRIPT]**

**[0:00:03] Robert:** I am Robert Lawton and I came in as an engineer in 1951. Probably a good place to kick off is how a farm boy from Kansas ends up at RCA Corporation, which at time was Radio Corporation of America, still. I grew up on a farm in Kansas, of course, kind of expecting to be a farmer, we all did. We all took vocational agriculture in high school. All four years of my high school were war years, 1941-1945. I graduated a little bit early. My birthday was in January so I was 17 years old when I graduated from high school, and so now the war was still on, and the probability of draft was staring me in the face.

And in August, when the war was over and I was up in Nebraska cutting wheat, and I came back and I happened to be at a small college in Kansas on a church retreat, and was offered a scholarship to start college. I had sort of thought about engineering but not electronics by any means. And so I went ahead and took the scholarship. Went one semester and the draft indeed was staring me in the face. A couple of us did not, you know us farm boys, we didn't want to wallow in the mud in the Army, us so we joined the Navy.

The war was over so they shipped us to Guam and all the CBs were coming back to take care of the infrastructure that had been done during the war. And so they pulled us out of the regular Navy and I became a power lineman in the US Navy, rather unusual. But a couple of us did not want to spend time in the Beer Garden, which had just opened up which were open, we still had many Japanese prisoners on the island and the Marines were coming from China through Guam.

So I spent a lot of time in the library in reading and I got intrigued about electronics. My father happened although he farmed, also was a licensed electrician so I had a little bit of knowledge. That's how I ended up in the power lineman business. But it looked to me like electronics was an intriguing place to go. So when I came back, I had one more semester of college and went to Kansas State and got a degree for electronic engineering. Right upon graduation, there were several offers, I could have gone to Boeing locally, in Wichita or Philco or RCA Corporation, Radio Corporation of America and I chose Radio Corporation.

**[0:04:00]** Well arriving here was something of a shock for somebody from Kansas. I'd never been involved in manufacturing, industry of any kind. RCA, I think there were 350 some, of us who arrived at RCA in 1951. Went on the rotation program: Scientific Instruments, the electro-microscope was being worked on then, and had pretty much fully developed and I was working on

some additional things that they were going to do with detection. Design of transformers and I remember staying in 1-building in 100-degree heat. There was no air-conditioning in any of the engineering except for speaker design. The radar operation of RCA was in 53-Building out on River Road. Harry Reeds was a Kansas State graduate, and so he called me in and we discussed the campus.

Another one at Harrison, the Tube Department. The fellow I roomed with up there, had somehow got wind that solid state was really going to happen. Now I had two senior papers, one was on transistors that I've never seen. And at the time of my rotation I'd still never seen one, they just weren't out yet. The other was RCA's color television. But so anyway, I finished the Harrison rotation and was assigned to a facility that I had not had a rotation in which was I don't remember what it was called at that time. But it was radio communication. They were doing the PRC series of military radio, backpack radios, and power amplifiers and what have you.

The first job I worked on was a version of LORAN for Navy ships. RCA had developed a LORAN for aircraft and this was a derivation of that, on that design. Again, no exposure to any of this prior to coming to RCA. And still something of a culture shock.

Then I worked on a vehicular power supply, 12-volt power supply for a jeep. I guess they were 6-volt at that point, which used vibrators, mechanical transformations and had a power amplifier so he could put a speaker on these PRC backpacks, where you just plugged it in. It sat on the shelf of the jeep. So that was the second job I'd worked on. I guess I did alright with that because the next one was ASURAC, which is sort of a portable version, a tactical version of LORAN.

**[0:07:38] Interviewer:** Okay.

**[0:07:39] Robert:** You could set up the transmitters and what we were building was the transmitters. I was reporting to a gentleman by the name of Jay Aris who mentored many of us. And his background was high-power amplifiers. And so they apparently had some confidence in me because that was the first project that I did. I can remember that it was a successful one. I can remember we had waterproof cases that we put these transmitters in and I remember being in the thermal vacuum chamber and the pressure release valve didn't release and so it was starting to blow up. You encountered those in engineering.

Now, as a power amplifier operation we got involved in something called tropospheric scatter. It was a beyond the horizon transmission method that uses turbulence in the troposphere to reflect down some part of the power to transmit up there. So for several years we were involved in tropospheric scatter programs. I wrote several articles for RCA Engineering and what have

you on tropospheric scatter. So we installed those in what was called a gap forest in Labrador and across the top of Canada to transmit signals between the various radar stations that we were putting in up there. Several of us made trips to Labrador and Iceland. The big ones were at Iceland. I didn't make that one, but I did at Labrador I recall. We had service company people to do the civil engineering work, in siting these things.

I remember being in the northern most, it wasn't quite [inaudible 0:10:09] but it was northern Labrador. And the service company people had forgot to bring a prism because Polaris is almost directly overhead and you couldn't see through the telescope to spot the North Star. So that got me involved in the tropospheric scatter business. We eventually, not in my group, but another group developed TRC-97 series of equipment, which is a tactical tropospheric scatter system. I have to refer to some of my notes on just when that was.

**[0:10:56] Interviewer:** Oh, that's okay.

**[0:10:59] Robert:** But you know I got involved in the system analysis of course and that was a trip up there. But in six years I was upgraded to a leader, and the primary job that we had was with the Air Force as a subcontractor to an outfit called Page Communications Engineering in Washington, DC. They had a subsidiary that did design work but not manufacture. And they had put together an ionospheric scatter system, much bigger antennas, huge antennas. They were several hundred feet high and wide. They were kind of a bedspring antenna system. And 60 kilowatts of the VHF power to send multiple telegraph signals across the Pacific. There was no cable across the Pacific. Islands were too far apart for tropospheric scatter.

So they contracted us to build all of the equipment, and we were doing all the power and radio equipment in my group as a leader. And our subsidiary at New York City on Canal Street, was building the multiplex system, which takes multiple teletype inputs and places them on the radio system. So that was my first almost management job. But it was a huge job and we had our problems. The paid subsidiary Ricson had built one of these things, but had not put any drawings together on it. So they were drafting it as we were trying to build it. But we did get that system in.

And so that was my first management job and I'm not sure how good a job I did, but at the end of that there was a program in Moorestown, well no, there's...

**[0:13:50] Interviewer:** Can I ask you one question about your early period, when you became a leader?

**[0:13:52] Robert:** Sure.

**[0:13:55] Interviewer:** Were there some, was there a mentor, somebody who really directed you?

**[0:13:56] Robert:** Well as I say, Jay Ayers was a mentor to many of us.

**[0:14:00] Interviewer:** Mm-hmm.

**[0:14:02] Robert:** Not a high level manager, he was a leader, and so yes. Jay Ayers was, there were three of us particularly one young man Fred Cohen who established a company of his own, Wesman Clements who worked with me all those years, as a system engineer. And we were mentored by Jay. And within two years, when the Peter Principle set in, I was a manager section manager. Now, our problem was that we had a job in production that wasn't ready for production. So it kind of established me as a troubleshooter, if you will, even though I was a manager. It took us several years to get those programs on track. The programs were called GKA5, which was a UHF ground transmitter and the TKA-2, which was another UHF system. And we had to shut down production. It's one of these things that, and one of our weaknesses we might not have had good enough design reviews in those days to really catch things before we went into manufacturing.

We did square them away and around about then we established a manufacturing facility in Cambridge, Ohio. I actually thought about transferring out there, being a farm boy in Ohio.

**[0:16:00] Interviewer:** Closer to home.

**[0:16:01] Robert:** A bit, yes more rural but decided against it and stayed with the job. And once we got that squared away, and we actually manufactured several hundred of these things both in 54-Building, which was again at River Road, but across the street from where radar was. And of course by then Moorestown had been built and they were building radar down in Moorestown.

I ended up in Moorestown on a special assignment on what was called the AADS-70, the AADS-70, which became the SAN-D Program and the Patriot Missile Program. And we lost that proposal and we really didn't give it enough communications flavor to win. We also had Beach Aircraft as the missile supplier. So Raytheon won that job, but at that was a special assignment for me. And when I came back I took a downgrade. We all have our ups and downs.

**[0:17:29] Interviewer:** Yes.

**[0:17:35] Robert:** But I got an increase in salary, which was puzzling to me. And I decided that perhaps I needed a different approach to my engineering management. So I had this job as an engineering leader and I took the basic philosophy that I was the guy running it, not my boss. And he and I did get into some conflict along the way. But it was for a ground demodulation system with a video that was coming back from a lunar orbiter. We were just exploring the moon at that point. The satellite was orbiting and sending a signal back.

What I did do was do my own analyses and not just follow the specifications that came down from the prime contractor, which was Heightstown and that plant had then been built. And they were basically my customer for this device, and discovered that the signal to noise ratio that they were specifying, was a full 10 to 1 off. It wouldn't work. So I immediately went to my systems group, which was... and they provided a guy to do, to confirm my analysis and give me some input of what hardware changes had to be made and proceeded to make them. Well, that didn't sit well with my manager again. However, in fact I had a meeting with the chief engineer along with him on that subject.

**[0:19:44] Interviewer:** Mm hmm.

**[0:19:43] Robert:** However, the Astro people I don't know whether they were called Astro at that time but they were our satellite people, did agree with me and all was well. And we did build about 20 of those things. I still have some place in my possession a copy of the lunar surface that was sent back through those systems.

So, along about that same time we were doing some Minute-Man work, and at the end of that point a fellow by the name of Gene Caukman was the section manager, and was trying to talk me into getting back into the section manager, I hadn't done too well before. And after several weeks of expressing my reluctance, I did take him on again as a section manager. Now what I picked up as a section manager was something called a microwave and missile control system engineering activity. Now they had a microwave system called a GRC-50, and I'd been involved in the design but I, they were responsible for following all the manufacturing and so on.

Also, some other microwave equipment and we on IR&D program were building a frequency division multiplex ... a frequency division multiplex, and that takes voice signals and combines them as analogue into a single stream that can be modulated on the radios. It never, you know we achieved all of our objectives but we were transitioning into digital. So we were too late with the product. Another failure I won't attribute to me but you know our section manager seemed to think it was still good.

At that point the TROP-97, which is the tropo-scatter unit that was developed by another group, Walter Conner ran that group and there was no designs, was in production. And so we followed that production, plus the GRC-50 production. There were always things cropping up and everybody wanted an immediate fix. But in production you have to worry about it, so timing was my thing, and it seemed to me that I always got in after something had gone wrong. And so as the section manager, that did grow and Mr. Conner who was running the development, well we actually won the small SHF Satellite Ground Terminal Development Program, for prototypes for all the tactical satellite ground terminals, for all but the Navy.

The Navy had their own, but the Army, Air Force, Marines used this... these tactical satellite terminals.

So I got a different title. Conners Group was developing these. We were in some cost troubles, which very often happened. There were incentive contracts of various kinds, but generally cost type contracts. Weller and Obie Cunningham who was the section manager at the time, had gone to the Army who were developing this and said we'll take it fixed price, just to settle out our cost problems. Well that's when Frank Bailey and I were assigned to this, because when Walt Conner went up to Raytheon and became a fairly high level manager at Raytheon. But we were faced with completing this program. Again part of my reputation for getting into...

**[0:25:25] Interviewer:** ...to the messes.

**[0:25:28] Robert:** Into problems. And so we did complete those, not without difficulty. We then did the proposal to produce and design final product. Those were all prototype products, and there were a number of them. There was a jeep mounted. There was a small truck mounted. There was a large truck mounted. There was an aircraft one. There was a backpack that you could pack in. So we did finally complete those, not without problems.

Now that work was being done on Route 130, in a separate leased building. And so we did win that production proposal. So I had a pretty good grounding in the satellite ground terminal area. So I was involved with a pretty good-sized group in designing the small SHF satellite terminals and hundreds of them, which have been built now.

And I went through all the qualification testing. We did a satellite test, not a satellite a helicopter lift test on one of our terminals. And the guys somehow mixed up the harness that we used to lift and we dropped one from about 50 or 60 feet. So engineering does have its problems. I can remember going through the insurance aspects of that. But everything survived except the carriage, the wheels and trailer that the thing was on. And we did produce a number of those.

And so, now let's see we also did... well we bid on a number of things, terminals for the White House, which I don't think we won. And we did a lot of advance work. Now, in about '72, I got re-designated from just the satellite area to a broader radio frequency area, we chose to call transmission equipment engineering. And there, we picked up the follow of a number of programs including the IR Squared Program. We were supporting integrated radio room for the Polaris submarines. Now, that was people from my group. I could not supervise any of that work because, per se, but they were part of a huge team and I'm sure some of the other interviewees will have descriptions of the integrated radio room and taking

existing equipment, supplying new equipment where necessary to integrate this complete submarine communications room.

**[0:29:53] Interviewer:** And did you like doing that higher level supervising or did you like being on the ground and getting your hands dirty?

**[0:30:00] Robert:** I, I am a hands-on type. So we had a number of those things. So I had the entire RF group in surface communications. There were the separate airborne operation. And along about that time the chief engineer was I think was Bob Parker at that point, concluded that we would combine those two operations. Now the leader of the Aviation group was a specialist in optical disk recording and at about that time, RCA got involved in Indianapolis into videodisks. So he chose to go with that operation to Indianapolis. And the chief engineer in his wisdom provided and put all of that under my purveyance, which involved P3-C radio rooms, which had been developed previously but which was still in production and created it's series of problems. And a number of other programs that were in the radio area.

So I ended up as manager of all of the radio frequency in Camden. We were doing work at low frequency, which what was... what's it called? I don't recall what it was called but it was a huge emergency communications operation that we were supporting. HF, we were doing advanced work in HF and a consultant had been brought in, Dr. Rodie, he was the son of the founder of Rodie and Schwartz over in Germany. He was brought in to develop the HF businesses. Again, I had some counter viewpoints on whether HF was a viable communication medium at that point in time. We also had a program come in for intelligence work for the Israelis. I have a mental blank on what it was called. But anyway we again had some differences in opinion on whether we should be attacking that program.

Now they did indeed do that. But in the process I was again relieved of my duties and put on the chief engineer's staff as design assurance, which appeared to be my forte. Anyway it was a troubleshooting a program that had problems. I spent several years in that job. And I was contacted by Challie Schmidt, who was then running the Astro Division, which is the satellite space division of RCA, regarding a program called The Advanced Communications Technology Satellite Program. It was a NASA prerogative, again with some dissension at the top of NASA, mainly because it was intended to develop a new frequency band, for commercial communications. And was not... it was, the people who ran NASA at that time were more interested in the moon and Mars and getting to Mars primarily. Before we were done with that program, Dan Goldin from TRW took over NASA and he definitely wanted everything going to Mars. So that's where we stand today.

**[0:34:54] Interviewer:** You did a lot with the government...



**[0:34:55] Robert:** Yeah.

**[0:34:57] Interviewer:** Did you, how was that relationship?

**[0:34:59] Robert:** Actually with people who count, who are the people that Lewis Research Center, which is now Glen Research out in Cleveland, was excellent. So anyway, Challie Schmidt contacted me and said we have this program it's been kicking around now for a couple of years in Congress. Congress wants it, NASA's leadership does not. NASA is still working on it, at Lewis, and it looks like it's going to fly, Congress is going to pass this and he said the guy that designated as manager is going to take over the earth resources operation, which has just been spun off. It was a quasi-government for a while. And anyway, he was taking it over and he wanted a program manager.

So I ended up, well I should say it took me about four months, but again, the Camden general manager would not let me depart until we solved another production problem, which was phase noise in our small satellite terminals. So I reverted to engineering at that point and between Don Bussard and I we discovered that a change had been made in a very critical part of the small terminal, which was the controlled crystal oscillator that controlled all the frequencies in the system. Someone had changed a steel case to a brass case and we had magnetic coupling into it. So having solved that problem, I was finally allowed to go and take over the ACTS Program. It too was one of these programs that has... so we spent a lot of time with money. And a lot of time with technical requirements. And it was a turnkey program with both the space and ground segments, and all the software, all one big contract.

So I ended up at Astro for at the last five years of my tenure at RCA. I retired, a bit early, I was 61 before that program was complete. But I had handled it from the first five years, and managed to... and it turned out to be a very successful program. We opened up what is now called the Cave Program, cave and frequency spectrum, with that program.

I could go into far more detail on the satellite but I don't think that's appropriate for just creating history.

**[0:38:51] Interviewer:** Yes.

**[0:38:50] Robert:** So, that's my history with RCA. Some of the things that I worked on.

**[0:39:00] Interviewer:** What were you going to say as far as...

**[0:38:55] Robert:** ...go ahead.

**[0:38:59] Interviewer:** I was just going to ask you about our coworkers, what were they like?

**[0:39:04] Robert:** Most of them, well let's say nearly all of them, were great. They're knowledgeable people. Now during my tenure, I think the company changed

character, and this has little less to do with personality than it does just company character. but after I once got into what industry is about, RCA... we used to take it to think it to be... the RCA family was kind of hokey. But I think in those earlier days for the first 20 years or so, it truly was that. I was involved, there was an athletic association, we paid dues into it. We played basketball, which was my big thing, and we had softball. We had a skiing club. And so it was very much a family.

When I was a leader, early in my tenure as a leader, there was a magazine called The RCA Family... something. RCA Family, something.

**[0:40:50] Interviewer:** Yeah.

**[0:40:49] Robert:** Anyway there is an article on me as a leader, and some pictures of me doing my work and meeting people, boarding an airplane and all that sort of thing. And so it was kind of a family.

**[0:41:03] Interviewer:** Yeah, and what changed?

**[0:41:05] Robert:** I think we tried to spread ourselves too thin. I think when Bobby Sarnoff came in and we became a conglomerate and then secondarily after that, we didn't quite track the digital world quickly enough. We tried to go into computers and compete with IBM. And we just didn't have the secureness to do that. Nor, did I think we had the advanced development that we needed. I thought that the RCA labs was a great, great incubator, and I think history has shown that to be the case,

**[0:42:00] Interviewer:** Right.

**[0:41:56] Robert:** Right up to color television. But at some point we kind of lost to the digital world.

**[0:42:06] Interviewer:** Mm hmm.

**[0:42:07] Robert:** And we just didn't capitalize at that point. Now from a personnel standpoint, certainly all of our relationships were much closer than what we see in industry now. At least at the time I left, which is seven years ago already. But generally very, very knowledgeable people. We had a solid systems group in the Camden facility. And anyone I encountered at Astro truly knew what was going on and how to keep things moving.

**[0:42:49] Interviewer:** Right.

**[0:42:50] Robert:** So I just can't imagine anything more dynamic than what I encountered and I think as RCA Corporation, we were a very dynamic corporation, most of my tenure there.

**[0:43:10] Interviewer:** Did they recognize you for all the work you did?

[0:43:09] Robert: I always thought so.

[0:43:12] Interviewer: Mm hmm.

[0:43:14] Robert: You know as individual relationships, now I don't know how many people had the same ups and downs that I did.

[0:43:24] Interviewer: Right.

[0:43:25] Robert: But as I said earlier I came to a little different philosophy part way through and said I'm running now I have to sell what I want to do to my boss. If he wants to override it I've still got to do it or I've got to leave. It was a philosophy that developed part way through. In those initial few years, I was trying to do what I was instructed.

[0:43:55] Interviewer: Right.

[0:43:58] Robert: Not good for an engineer and not good for a manager either.

[0:44:04] Interviewer: As a manager did you enjoy hiring new people?

[0:44:07] Robert: Hiring was not too much of a problem. Layoffs were always a problem.

[0:44:12] Interviewer: Right.

[0:44:13] Robert: Layoffs are difficult. It requires ranking people and nobody likes to rank people.

[0:44:22] Interviewer: Right.

[0:44:27] Robert: It also requires evaluating need and you might make a decision on need rather than skill. So it's difficult to lay off people and not hard to hire. There were periods when it was difficult to hire. I think most of that was unique, a salary thing, but in general... you go ahead.

[0:45:02] Interviewer: What was the best thing about working at RCA?

[0:45:06] Robert: The best things about working at RCA? I suppose the personnel I was with. Again skill level, partial family atmosphere I think that's the best part of working there rather than someplace else. At various times, I would take a look elsewhere and I didn't find the environment that I liked better.

[0:45:42] Interviewer: Okay. What was the worst thing about working at RCA?

[0:45:46] Robert: I suppose that it was the failure to maintain RCA. I remember and I believe the man's name was Frederic, was talking to Challie Schmidt in a meeting at Astro and I remember Challie coming out of the meeting and saying, they've killed our dog. And you know I think to the worse part was the loss of RCA.

[0:46:30] Interviewer: Mm hmm, yeah.

[0:46:36] Robert: Everything else was pretty enjoyable along the way.

[0:46:41] Interviewer: Now did the RCA family... I've heard the story that the RCA family including building families that men and women met at RCA and became...

[0:46:50] Robert: Oh, I suppose that it's true.

[0:46:50] Interviewer: There was a lot of courting going on.

[0:46:52] Robert: It wasn't true in my case but yes. I know a number of couples that had met at RCA.

[0:47:04] Interviewer: And fun celebrations?

[0:47:06] Robert: Huh

[0:47:07] Interviewer: Fun celebrations at Christmas and things or did you participate in that kind of stuff in your life.

[0:47:09] Robert: Oh yeah, yes. We always had section parties. I can remember section parties out at Medford Lakes. I forget the name of the place out there. And so early days, even in more recent near my retirement, we would hold section parties at Christmastime. And retirement parties were quite elaborate.

[0:47:50] Interviewer: So you must have moved into south Jersey in the early 50s, it was very different wasn't it?

[0:47:56] Robert: Yes.

[0:48:06] Interviewer: And how do you think the impact that RCA had on that changed?

[0:48:12] Robert: I don't believe that RCA either contributed or diminished the change. Now I don't know what to attribute that change to, but I lived for the first few years, I lived in east Camden just off Federal Street at 26<sup>th</sup> in an apartment over the Anson Hardware Store. And I thought nothing of living there. For a nickel I could catch the bus and come right into Federal Street and walk off, right in the front door of 1- building where I was working at the time. So now I don't see how either the demise of RCA or buildup of RCA would have changed what has happened to Camden.

[0:49:01] Interviewer: When you lived with your family was there a lot of other RCA employees living nearby you?

[0:49:07] Robert: Well you know I moved from there to Gloucester Township and there were a few there. I moved back to Cherry Hill, and there were lots of them there. But not close, no.

[0:49:30] Interviewer: So how would you sum up your time at RCA?

**[0:49:33] Robert:** Great, you know there were ups and downs both from a management standpoint, from a corporate success standpoint. But that's what it's all about. And so, I would sum it up as a great experience, and then I've said many times, I can't think of anything more dynamic than the electronics business from 1951 until 1989... well, I didn't leave it until 2003 or 2004, when I quit consulting.

**[0:50:14] Interviewer:** Right.

**[0:50:14] Robert:** So I just can't imagine anything more dynamic or rewarding than what we went through.

**[0:50:21] Interviewer:** Yes.

**[END OF TRANSCRIPT]**