COMSAT HISTORY PROJECT

Interview with Jack Harrington

Interview conducted by Nina Gilden Seavey

Interview with Dr. Jack Harrington
COMSAT Headquarters
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NGS: Is it doctor or mister? Mister.

JH: Doctor.

NGS: Doctor.

JH: Haven't used it in a long time, but it's doctor.

NGS: Okay. Dr. Jack Harrington, at COMSAT Headquarters, in Washington, D.C. It's January 6, 1988, and the time is 10:25 a.m. Why don't we just go ahead and start by you giving me a brief outline of your past and how you came to the laboratories initially.

JH: All right. I haven't thought about this for a long time.

NGS: That's the whole reason we're here.

JH: I have to ramble around a little bit. My past. I guess I've had three main jobs in my career. The first

two were all at MIT where I was for some 23 or 25 years.

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NGS: In what capacity?

JH: Half of that time I spent at Lincoln Laboratory and I ended up running one of the major divisions at Lincoln, the Radio Physics Division. And then, in the last ten years of my stay at MIT, I was the Director of the Center for Space Research and a professor of electrical engineering and of aeronautics and astronautics. And the job there was very heavily in the direction of a research lab, but it was also some teaching and some work with graduate students and some consulting and so on.

Now, it was in my capacity as a consultant that I first ran in or had contact with COMSAT. I became a consultant with another colleague of mine, Professor Davenport, to Dr. Charyk in the very early days of COMSAT.

NGS: When you say, "early days," how early do you mean?

JH: Well, the company was still about 20 people and it was in the old estate, I forget the name.

NGS: Tregaron.

JH: Tregaron. And they were just beginning to consider what kinds of satellite systems might be their first attempt at an international system.

NGS: So, was this before or after Siegfried Reiger had joined the staff?

JH: This was when Siegfried Reiger was one of the principal engineers within COMSAT. He was in charge of Systems Engineering, I think it was, and it was before he became a vice president and the head of Engineering. He and Sid Metzger were the two principal engineers at that time in COMSAT. And at some time later, I would guess six months later or a year later, Reiger became the Vice President for Engineering, or technical, I guess, and everybody then reported to him.

Our consultantship was, I found, a very, very interesting assignment. We got into satellite systems. We got into minor research problems and major research problems and we got to know all the people in COMSAT very, very well.

NGS: Well, let me ask you a question; let's go back.

When you say that you got involved in the determination of the system, are you saying that the system had not yet been chosen and that you were doing basic research on the kind of satellites that would be used, or what is it that you . . . . [Inaudible].

JH: No, I wouldn't call it basic research. But you remember that COMSAT in its early days had the mission to put up some kind of an international satellite communications system. But the nature of the satellite system, you might say almost the conceptual design of the system -- whether it should be a low-altitude, many satellite system, or whether it should be a high-altitude, synchronous altitude, few satellite system -- had not yet been determined. For one thing, there was considerable doubt about the state-of-the-art with respect to synchronous satellites, and conservatively one would be inclined to go with the satellite systems that had already been proven. Now, TELSTAR had been launched and NASA had launched a number of low-altitude satellites, and there was a considerable, I wouldn't call it research, but it was a very heavy engineering investigation into the relative merits of those two systems.

NGS: Now, let me ask you a question. Siegfried Reiger

had come from the Rand Corporation which had been . . . .

JH: Right.

NGS: . . . . an advocate in many senses of the new technology of geosynchronism.

JH: Right.

NGS: Would you say that those studies were weighted in that favor, or . . . . ?

JH: No, no, not at all.

NGS: How do you perceive that, then, occurring?

JH: Well, I remember that Reiger wrote a fairly fundamental report with somebody else on satellite systems. And I always considered that he was pretty well-balanced with respect to the relative merits of the two. He may later have really become very heavily in favor of the synchronous system. But I think the thing that tipped the balance in favor of the synchronous system was the launch of the Hughes Satellite, what was it?

NGS: SYNCOM.

JH: SYNCOM, yeah. And that was, you know, that was just a clear demonstration of the practicality of the thing. And then once that was shown, once the engineering state-of-the-art, you might say, was established, the overwhelming financial advantages of going with the synchronous system were, you know, it tipped the balance that way.

NGS: Although just the fact that you knew that you could in fact launch the satellite, put it into geosynchronous orbit, didn't necessarily mean that it would be a commercially viable system because of the time delay.

JH: Yeah, there were time delay effects which under certain circumstances can be troublesome. The Bell people [Bell Telephone Laboratories] made a big issue of that.

NGS: The "Bell people," meaning John Pearce?

JH: Yeah. The Bell Labs people in general and the AT&T people in general. I wouldn't particularize it, but John Pearce was certainly one of the strong spokesmen of [the time delay effects on satellite communications].

NGS: Now, do you feel that there was pressure on the part of the engineering staff by the people at AT&T? Obviously, who had TELSTAR, had had success with TELSTAR.

JH: I think it was clear that if one left it up to the Bell System to specify the nature of the satellite system, the specification would have gone to a medium-altitude satellite, and the reason was to control the delay. Which is annoying, no question. It's very annoying. Even today, when I watch international t.v. and, you know, Jane Pauley in New York is trying to ask questions of So-and-So in London and she gets going too fast and he gets out of phase, and it really makes a mess. It's something you have to learn to use but, you know, if you can use simplex radio, which everybody uses to do pretty effective communication, which is the extreme example of bad delay, you know, I mean a couple of seconds of delay can be tolerated, I think.

NGS: Now, what happened in the relationship between the AT&T people and the COMSAT engineers when in fact the two scales were tipped in the direction of the geosynchronous [system]?

JH: I don't really remember any really what I would call strained relations or bad relations at all. I think that the Bell people were, by and large, pretty objective people, and I think some of the tests showed that you could, you know, that the delays were manageable or tolerable. And I really don't remember any, you know, any vicious in-fighting or anything of that sort.

NGS: Well, what about Sieg Reiger's management of that project or that process, actually, how would you characterize that? We need to get a little bit more about Sieg Reiger.

JH: Sieg Reiger?

NGS: Since we can't interview him.

JH: No, you can't.

NGS: Give me a better picture of him in this process.

JH: Well, give me a minute to think. I haven't thought about Sieg for awhile. He was, you know, he was obviously a very complex guy, a very . . . .

NGS: In what sense?

JH: In the sense that he had a tremendous amount of ability and really even skill with people. I thought he was a good manager. He could spot the strengths and weaknesses in people, and I thought he used people properly. But I also think he had, there were insecurities about him, too.

NGS: What do you mean by that? How did that display itself, would you say?

JH: Well, he had drinking problem, which I guess is . . .

NGS: Documented.

JH: legioned. And it seems to me he did, because of some of his uncertainties, you know . . . . . let's see, if I try and think of an example of why I believe that to be true. [Pause] I can remember on one occasion when I was consulting for both Charyk and Reiger, that he needled me a little bit. He says, and I think he was feeling sorry for himself and this may be an unfair thing to recount, but he was saying something about, "What can you do about getting me a doctor's degree?" You know, I think

he, here he is, a very accomplished guy, highly regarded and respected in the profession with a record of accomplishment that, you know, was really outstanding, and yet he felt as though he was hampered by not having all the credentials to, you know, to be able to do or to be able . . . .

NGS: You mean not having his doctorate . . . .

JH: . . . . to obtain the prestige that I think he felt [he wanted to have]. And, you know, I just said the standard things, "You don't need one, Sieg, you got something better."

NGS: Although, out at Rand there were a lot of people who didn't . . . . [Inaudible].

JH: Yeah, a lot of people.

NGS: That were working on very important projects.

JH: Yeah. At that time, there was a lot of, oh, I don't know, warped snobbery I guess about these things, particularly within the government circles. And INTELSAT and COMSAT had a heavy government flavor, I think.

But, anyway, I thought he was a very, very able, sensible, practical guy who was really a fine engineer and who really did a lot to steer COMSAT into the, you know, into the synchronous altitude system and to overcome, in an orderly way, a lot of the arguments against it. I think he had a lot to do with persuading the INTELSAT people to accept Early Bird.

NGS: When you say, "the INTELSAT people," now, there is no INTELSAT yet [at the time we are talking about].

JH: No, but there was a committee. What was the name of the committee that, you probably . . . .

NGS: The ICSC.

JH: ICSC. Well, he really had a very great influence with them, just by force of his knowledge and his ability to reason, his ability to present things. He got very mad at them, I know, at times because he would beat on them.

NGS: So, then, would you say that he worked a lot with John Johnson?

JH: Yes, he did. I think he and Johnny were really two

very key people in the early days of COMSAT and INTELSAT, too. I think John had a lot to do with, oh, I don't know, the more administrative, I guess, legal aspects, but I think Sieg was the dominant one on the technical decisions.

NGS: So, not Dr. Charyk, then. Or, how would you . . . . [Inaudible]

JH: Oh, no. I don't want to, I wouldn't take anything away from Charyk. But I think that, you know, after all his decision was the final decision. But I think he got damn good advice from both Johnson and Reiger, and us, too. But you know, he was, I think Charyk was very sensible and very pragmatic in a great sense. And I guess his greatest achievement was to have damn good people working for him. He had Johnson and Reiger giving him really good advice.

NGS: Okay. Well, let's move along, then. You know, now we've got the decision to go geosynchronous, you've consulted for the corporation. What's your next step?

JH: The next thing I got involved in was that Reiger asked me to form a little committee to look into the merits of the Corporation having a research laboratory.

They were beginning to feel the need for a research lab. And the reason, and I guess this came down from the Board or Charyk and Reiger, I'm not quite sure. I was not, you know, an intimate part of the COMSAT management at that time, but my impression was that it was pretty uniformly felt within the upper levels of the corporation that the company needed an R&D facility.

Now, it needed an R&D facility for rather unusual reasons. It needed it to produce people, not necessarily hardware and not necessarily,

NGS: When you say "produce people," what do you mean by that?

JH: Well, here COMSAT had a major management responsibility, which was to manage the growing and what now is called the INTELSAT System. And it needed a lot of very, very good, sound, practical, hands-on, technical management to do that. Because there are lot of . . . . if you look at the nature of INTELSAT I, which was Early Bird, and then II and then III and then IV, each of those satellite systems was really markedly different: had different antenna systems; different control systems; they had different stabilization systems. There were very,

very substantial technical changes from one of those to another. And somebody had to decide on the merits and the wisdom of going with those kinds of things, because the contractors would propose, you know, almost anything that they thought would work and that they thought they could build. But whether this was in the best interests of the customer to buy was another question. So, you needed very good engineering people to evaluate all these different proposals, to sit in judgment on some of the technical features, and to, you know, essentially to manage the risks involved. And there were substantial ones, really substantial ones.

Now, the question is how does a company get these people. Engineers don't last very long as just paper-pushers, you know. You've got to have some hardware experience or some hands-on experience, you've got to get your hands dirty. Otherwise, you're no longer, well, your judgment becomes questionable. So, they wanted the lab as a way of having things developed that would be useful. But [they wanted the lab] primarily to give people, technical people, some hands-on experience to produce the technical talent and to maintain the technical cutting edge, you might say, of the engineering organization in those, particularly in the early days of COMSAT.

NGS: Well, now, why not develop, say, an ongoing consultant relationship with somebody like Lincoln Lab or University of Rochester . . . . [Inaudible) . . . . engineering centers?

JH: Because you would then be, you remember, now, COMSAT was in the role of an intelligent buyer for a satellite system. It was not to be a manufacturer. This was by agreement, okay? So it was to be an intelligent buyer of systems that, you know, of many hundreds of millions of dollars in value, maybe even billions of dollars if you add it all up, and they needed internally the judgment and the acumen and all the rest of that to really spend that money wisely and to purchase equipment wisely. Now, that's not something you can farm out to a consultant, I think, you know, there are serious exposures there if you do it, because he can, you know, his interests may be different from yours ultimately, especially if he's got other clients. The guy making the hardware isn't completely reliable in that respect either, because he also has other interests.

NGS: Now, COMSAT had a very, sort of unique relationship with the hardware manufacturers.

JH: Yes, it did. Yes, it did.

NGS: Can you explain that a little bit more to me?

JH: Well, because COMSAT didn't have its own satellite manufacturing facility, the manufacturers of satellites would talk freely to COMSAT. COMSAT wasn't a competitor, it was a customer, and the result was that when COMSAT needed to know anything or had some questions about the possibilities of a new system of some sort, they could go freely to a whole bunch of contractors and the contractor would respond with recommendations that in his best judgment, you know, would work. And COMSAT would be in a position of having to evaluate all that and to pick the best of them, you know, to put the different ideas together and end up in a satellite specification that was in the best interests of the INTELSAT system. And I think by and large it was a pretty good arrangement that worked. But the lab . . . .

NGS: Now, do you think that the contractors were worried about the confidentiality of the information that was passed along?

JH: I don't think at that time they were. They may have

been worried [about that] later but not, I don't think, at least through the INTELSAT IV development, I doubt very much that they were worried about it.

NGS: Another aspect of this relationship obviously is the fact that we didn't just ask for advice from them but actually went and lived in their laboratory premises.

JH: Oh, that's right. But that was after they had been awarded a contract.

NGS: Right, that was after Hughes had gotten the contract.

JH: And then we had resident engineers who would essentially witness all the test programs. You know, there were a lot of technical risks involved in the early days of the satellite business that . . . .

NGS: Can you give me some?

JH: Well, things didn't always work, you know . . . .

NGS: Well, aside from, that's true . . . .

JH: And the probability of success wasn't always a

hundred percent. There were a lot of failures. And there were hundreds of millions of dollars at stake in some of these, you know, in some of these launches, and the engineering approach to ensuring or to minimizing risk was to test at every level of system design. You know, you tested the components, then when those components went into subsystems, like a receiver, that was tested. Then the receiver was placed in a satellite and the satellite system was tested, and so on. There were a whole series of increasingly broader tests and increasingly more demanding tests that essentially reduced the risk with respect to satellite performance after launch. And that worked very, very well because COMSAT's record in achieving successful satellite performance in orbit was really outstanding. Really outstanding.

Now, and this was in the first 15 or 20 years or whatever of the company's history. Now, in order for those tests to be meaningful, you couldn't just take the word of some circuit designer that, "Yeah, I tested the circuit and it works fine." You know, that's worthless. So, we had people in the plant to witness tests and to make sure that the tests were stringent enough so that they would be significant. And often the tests would reveal shortcomings and then there would be questions of: How are you going to fix it? What's the redesign approach

-- and all of that would get reviewed. And our people were almost an integral part of the design and redesign team. I'm sure at times it was damned annoying for the, but, you know, from our point of view, that was tough. We ended up getting a product that we wanted.

NGS: Although they did end up benefitting, because the incentive contract made it so that . . . .

JH: Absolutely. They had financial benefits. And it also . . . . the information flowed two ways, too, because COMSAT Lab in the later stages had a tremendous inventory of know-how and of technology and so on, and all of that was available to the contractor, too. And while we had free access to his plant and his labs he also had free access to our labs, and it was a two-way street. And there were many things in the satellites that were designed in the COMSAT laboratories and then picked up by the contractor. And there were things in the receiver design, there were batteries, there were, I forget, there were stabilization systems that benefitted very heavily from the work done here.

NGS: Well, now, so there was kind of this mandate that comes from on high that says, "Let's develop this research

development capability." What happens to your participation then?

JH: Okay. Now, at that point, Reiger had the problem. You know, I think Charyk said, "Okay, Sieg, tell me what to do."

NGS: [Inaudible]

JH: Yeah. So Sieg said, "Okay, what do I do now? I'll form a committee."

NGS: Always the best response.

JH: Which is always the initial, in Washington, you always form a committee. Well, I got made the chairman of the committee, which was a committee to write a charter for the Laboratory. And it was a four-man committee. Reiger was one of the members. And a guy named Jack Morton, who was a vice president of Bell Laboratories was, and a superb researcher, was another member. And Bill Davenport, who was a professor and later head of the EE Department at MIT, was the fourth member. And the four of us wrote a charter for the Lab, which is a document that floats around here someplace that you ought to be able to

get a copy of, which I thought was a pretty good charter. It was about a 15- or 20-page document and it said what the Lab was supposed to do and why and all those good things. And on the basis of that charter, I think Reiger was able to make a presentation to Charyk and the Board which essentially got the concept of the Lab approved. Then the next thing was to begin to staff it. And I think Bill Pritchard was the first director.

NGS: That's right.

JH: Reiger persuaded him to come in from Aerospace.

NGS: Now, why wouldn't you have done that?

JH: I was offered the job. Reiger offered me the job. But I was happy at MIT and I, you know, my kids were in school in New England and all that. I really didn't want to come to COMSAT at that point. I had enough on my plate. I had a pretty good consultant practice. I was a professor at MIT and I was the Director of the Center, and I was on a couple of boards and I had about all I wanted to do. So, anyway, Sieg did offer me the job, though. But I told him, "No, I didn't think I would at this point." You know, whether that would have gone on beyond

Sieg, I don't know.

But anyway, we wrote the charter and then Sieg hired Bill Pritchard to staff it and they began getting some pretty doggone good people. And I think Sid Metzger had a lot to do with hiring many of those people, too. And Sieg himself did, and Bill did, too. Bill put together a good organization. But the pattern of the organization was pretty much what we had had in that charter we wrote.

NGS: So, they kind of followed along the line [the chart described].

JH: . . . . followed along the line. Well, they were obvious things. I don't think it was very profound, you know, but it was obvious what was needed to match best into COMSAT's mission.

NGS: Give me some ideas.

JH: Oh, there were things like, you know, there was RF technology and spacecraft technology and quality control and solid state physics, that sort of thing. It was pretty clearly what was needed. And I'm sure Bill massaged that somewhat and we agreed with that, though, because Bill and I then became, in our continuing role as

consultants to the Corporation, we spent a lot of time in the Lab and we kind of watched it develop and we were able to . . . .

NGS: So, you didn't just step out.

JH: Oh, no. No, no, no, no. I served as a consultant during that time and I used to spend time with Pritchard and I'd spend time with Reiger and also with Charyk. I worked the whole circuit. It was interesting.

Let's see, what, the next thing that happened is that I guess the Lab, during its growth process, or it went through a couple of building problems.

NGS: Well, first they started obviously at Tregaron.

JH: Yeah.

NGS: And then moved to 19th and, well, 20th and L.

JH: Right. And then the Lab had some space in one of those buildings.

NGS: And that's where the launch of Early Bird actually .

. . .

JH: That's right. That's right.

NGS: [Inaudible] was located.

JH: And then it was clear that if the Lab was going to go anywhere it had to have its own facility and resources.

NGS: So, were you involved in any way with that?

JH: Yeah, we had something to do with, I remember looking at the site and working with General Graw, who was an assistant to Reiger at that point. And, you know, we had a kind of peripheral role in that, I would say.

NGS: Now, was the Laboratories built to specifications that, would you say that you had helped develop in this, I mean, I'm talking about the physical aspect of it.

JH: Yeah, I would say that we had a, I don't want to imply that we were, you know, in charge of . . . .

NGS: No, I understand.

JH: . . . . saying what the design should be. But the Lab, I think Reiger had hired a contractor, an architect, to do the building design. And we had an opportunity to look at the designs that he came up with, and the idea of the long corridor with the research wings off it was something we generally agreed with, and the test cell and all that stuff. I would say we certainly supported that idea.

Anyway, that went on, and I guess the Lab moved out to Clarksburg and then they began working on a whole variety of projects. There were some very interesting things that Dr. Sekimoto, who's now President of NEC . . . .

NGS: Retiring. Or retired.

JH: Retired? Oh, did he retire?

NGS: Very, very recently. I would say within the last six months.

JH: Man, I didn't think he was old enough to retire.

NGS: Well, you figure he was at COMSAT 23 years . . . . [Inaudible]

JH: Oh, yeah. He must be my, yeah, he could be within a few years of my age, I suppose. Last time I saw him was in Tokyo, which was four or five years ago.

NGS: Now, Mr. Sekimoto, if you just want to give your recollection of what, of . . . .

JH: Well, he was a real spark plug in terms of the development of digital communications. And he was one of the early guys in the development of TDMA and he was involved in some other things, too, in television compression.

NGS: Now, why does he come out in your mind? Why does he stand out?

JH: Because he was a key man. His leadership really left some marks behind. I mean, you could see evidence of the fact that he had passed through the place, you know, and many of his ideas took root and became major programs in the Lab.

NGS: Now, he was part of the INTELSAT Assignee Program at that time.

JH: Correct. Correct.

NGS: And would you say that he was representative of the kind of people that were coming out of that program?

JH: No, he was outstanding in that respect. He was really an outstanding person, and his later career would support that. But during his two, I think it was two years at COMSAT, he made outstanding contributions and people had high regard for him and they would follow his lead. Maybe that's another mark of a good man is that you don't get a lot of back talk, people do what he says. And that was true for Sekimoto. That was true for Reiger, too, by the way.

NGS: Is that right?

JH: Yeah. Yeah.

NGS: Even in spite of some of these more, shall we say, personal issues.

JH: That's right. They felt sorry for him about the personal issues, but they would be highly, you know, had a very high regard for his judgment and his seriousness with

respect to the best interests of COMSAT and INTELSAT. He was really a strong believer in, you might say, "The System."

Well, anyway, so the Lab is now in operation out in Clarksburg, and we were spending some time out there regularly and I got into a number of things. But I guess my next major, well, there were two major things. One is that the INTELSAT IV system came along and that had a new stabilization system that had never before been tried on a commercial satellite.

NGS: That was the spin stabilizer.

JH: And that was a despun antenna.

NGS: Despun antenna, right.

JH: So, that it was, what you really could call a dual spinner, with a bearing between the two heads. And there were advantages to that in the sense that you could make a long thin satellite and then despun the antenna platform and put damping on that which would stabilize the whole thing. See, a long thin thing is fundamentally unstable. It wants to spin around its other axis and make like a [racer], you know, going on. Whereas you want it to spin

around the long axis and this had very great advantages in terms of large configuration and great advantages in terms of coverage and power and so on. But the question of whether or not the stabilization system was going to work well was really of considerable doubt.

There had been one attempt to stabilize a satellite prior to that by that method, and that was a government satellite called TAXSAT, which had a despun antenna. And that satellite ended up with a residual mutation; that is, it wasn't completely stable about its axis, the long axis would wobble around the desired position. It would wobble around by a degree or so. And [when] that happened, that observation was made about a third of the way through the INTELSAT IV Program, and Reiger really hit all the panic buttons. And he put us to work and I got heavily involved in the analysis of systems like that. And Hughes, of course, also had a big team, and all our, I think all our calculations pointed out that we needed a lot more loss on the despun member in order to guarantee stability. In other words, first we had to understand what went wrong with TAXSAT and then, secondly, what do we do about it with respect to INTELSAT IV. And it was really a major crash program and one, by the way that I enjoyed enormously because it was technically satisfying, and we got in and, I think as a result of our recommendations we

had Hughes double up on the dampers and do some other things.

NGS: Now, had you also been involved in the INTELSAT III development?

JH: Not to the same degree. INTELSAT III development was only peripherally something that we got into. That was another problem.

NGS: Yeah, because there was all kinds of issues surrounding that development.

JH: Yeah. Yeah, we didn't get into that to the same degree. I think maybe that's one reason why Reiger pushed the panic button and got, you know, he'd already been burned on III, and when things looked a little bit speculative on IV he really wanted all the help he could get. And it was a wise thing for him to do because the extra effort paid off.

Anyway, we did that, and I made a lot of presentations in here on our work, you know, on stable . . . .

NGS: Now, by this time COMSAT Laboratories and COMSAT Corporate are really quite, they're very distinct. I

mean, in the early days things were kind of meshed . . . .

JH: Yeah.

NGS: . . . . and then they clearly kind of split apart, especially with the physical construction of the laboratories at Clarksburg.

JH: Yeah.

NGS: How did you see the development of the relationship between the Laboratories and Corporate?

JH: Well, there was always a lot of inter-organizational rivalry for reasons that I, even when I was a consultant and not in the middle of it, I couldn't really completely figure out why.

NGS: What do you mean by that?

JH: Well, the Lab was really an outstanding place. It really was. In a technical sense, it was an outstanding place. I think it got well supported. I know it got well supported by the Corporation. I sometimes had the feeling that some of the other people in here couldn't understand

the rationale for putting all that money into it, into a lab, you know, when the company didn't have a product business and it didn't have a factory, you know, "Who needs the lab?" that kind of thing. And I guess it reduces to maybe a certain amount of jealousy. Be hard to prove, but I think, the people acted that way. I don't know. Whether it was true or not, I don't know.

NGS: Jealousy on the part of Corporate for the expenditure of those funds.

JH: Yeah. Yeah. That's right, that's right. Then there was the . . . .

NGS: Who would you say felt that way? Just from your bird's eye view.

JH: Who felt that way. Well, I tell you, I think a lot of the COMSAT General people felt that way. I would say that the engineering people, and remember, there was a separate engineering organization, separate from the Lab, and they had major technical responsibilities for the satellites and there was a lot of rivalry between the Lab and them, and that kind of fed, too. I don't think, I don't know about the financial people. I don't think they

really gave a damn one way or the other; and legal, they didn't, you know, they didn't care. But the operating people maybe, maybe it between the operating people and the Lab and the technical people here in the Plaza and the Lab, there were . . . And the Lab itself, it wasn't blameless in this. The guys tended to be a little bit arrogant, you know, "We're doing all the good work, and you guys are sort of slobs down there," and, you know, "you just twiddle a few knobs," and all that. You know, it was very poor inter-corporate relations, I think.

NGS: Now, would you say that there was any frustration in your awareness on the part of the people at the Labs that they were relegated to a support position essentially? That they weren't developing hardware, that they weren't sort of actually competing?

JH: I think there is a certain amount of truth to that. I think the Lab always felt that they were capable of greater things, and that somehow they were being restrained, artificially restrained, you know, from building satellites, getting into the engineering of full systems. And it was a case, you know, sort of like having a dog that was caged at all times, and being told that, "You know, well, the FCC wouldn't let us do this and the

FCC wouldn't let us do that, and INTELSAT doesn't want this." And, you know, it just got frustrating after a while.

In fact, that kind of frustration led to the creation of a project at the Lab, which was to be called a Core Project.

NGS: Core Project?

JH: Core, c-o-r-e . . . . where the Lab would do an experimental satellite. And Bill Pritchard wanted this as a focal point for his whole program, you know, all that, even though it would only be an experiment, you know, it wasn't going to be an operational thing at all. But it would be a way of testing out the new technology that could be used in subsequent INTELSAT satellites. And he put together a proposal on this and tried to sell it to a committee of the Board, which was called the Research and Development Committee, that Charyk was a member of. And I think on this R&D committee was Dr. Hagerty, who I guess has since died, and a fellow, couple of people from the Bell System. Bell people were still on our Board at the time.

NGS: Jim Dingman.

JH: Jim Dingman and Dick Hough, I think.

NGS: Dick Hough, right.

JH: Dick Hough. Well, some of those people when they got the presentation from the Lab were really outspoken against it. They said that that would not be a wise thing to do and all this jazz, and there really . . . .

NGS: Now, this occurred about what year?

JH: About '72, maybe.

NGS: Okay. So, still essentially pretty early on in the development of the Labs.

JH: Yeah. The Labs had maybe 400 people in it at the time. It was not trivial but, it was in the early stage, that's right. I forget when Reiger died. Reiger died someplace in there, too.

NGS: I'm not quite sure.

[End of Side A.]

NGS: So, you were talking about the Corporate . . . [Inaudible].

JH: Okay, the Corporate. Anyway, there was a presentation to the R&D Committee of the Board and they were overwhelmingly negative about it for varying reasons. I think they just felt that the Corporation shouldn't get into the satellite-building business on any basis. And Pritchard sort of got mad at that point and felt like the management was not behind him, and he quit. And I guess a number of other people, who were really outstanding people, quit along about that time, like, oh, they went off and formed DCC, which is a company that was started in the area. I forget who they were. I can't remember all the names. But anyway they were very, very good people, four or five of them.

And Charyk then had the problem -- oh, Reiger had died before that, some time -- and Charyk had the problem of finding a replacement for the lab guy and Reiger. And he called me up -- this must have been in the summer of '73 -- I guess, you know for help in trying to find somebody who could do it, and I suggested some names. I don't know, somehow the subject got around to me, I guess. One of the dangers of being a consultant is you might have to

end up doing the job yourself. So, at that point I had been running the Center for Space Research at MIT for ten years and, you know, my kids were all either in college or out of college. And I think I was about ready to make a change so I agreed to come down for a couple of years. And I joined the company in November, I guess it was, of '73.

And when I joined I had . . . . my job at that time was more like the one Reiger had -- where I had charge of both the Lab and the engineering organization in here. And I was attempting to tie all that together into one, "Research and Engineering," it was called. I think Charyk had previously hired McKenzie and Company to do a study on how the technical division should be organized, and their conclusion, that I had nothing to do with, was that there should be one research and engineering organization and that they needed somebody to run that. And so I joined and I had the lab and I had the engineering organization. And some time after that I formed a systems analysis group which did, we called it "Advanced Systems," I think, but fundamentally it was an advanced studies group. And I had essentially those three major organizations, plus Procurement. I had Lou Myer reporting to me too for a while.

NGS: Oh, that's interesting.

JH: Which was interesting. Well, the Procurement was tied in with satellite procurement, and Technical had a big role in that. So, I really had four key people reporting to me. Then, I don't know what happened.

NGS: Well, now, what would you say that your priorities were as you walked into that job? What did you want to change that Bill Pritchard had instituted? What were your plans?

JH: Well, my understanding, and I guess it must have been largely from talks with Charyk and with others, too, because I remember talking to McConnell, who was the chairman at that time. And I think the overwhelming problem from my point of view, and I think from theirs, was that the morale of the Lab was like a half-inch off the ground.

NGS: Now, why was that?

JH: Because Pritchard had left and a number of other people had left and it looked like the Corporation didn't give a damn about the Lab. And the guys -- these are a

lot of very highly paid, very good, very accomplished technical people out there; a lot of very good ones, with international reputations -- and they're saying, "You know, what in the world am I doing here?" You know, because jobs for them were pretty easy to find. And they'd say, "God, if the Corporation doesn't want us and doesn't really care about us, why should I stay?"

Well, of course, the Corporation did care, and needed them. And I thought part of my job was to repair all of that damage.

NGS: So, how did you go about doing that?

JH: Just by getting them all together and by having programs and by getting into the review of research efforts and so on, where I thought were relevant to the Corporation. By just acting like a bridge between . . . And I forget what we got into. We got into many other programs, too. We got into doing some studies for SBS. You know, what engineers need more than anything is some challenging tasks to do, and all these other intangible worries go away fast if they have a good job to do.

NGS: Now, would you say that the Pritchard, his bailing out, made it so that you lost some of your top talent? Or

he just kind of took some people along with him but yet there were sort of others who . . . . [Inaudible].

JH: No, he didn't really take anyone along with him. But some of the other people at that time left for the same reason. They just thought that there wasn't any future in COMSAT for them and that they would be better off doing something else. And these were the people that started the Digital Communications Corporation, and made a great success of it. And then there were some other people that left and got into the solar cell business and some others that did differing things. And there were a lot of losses, and as I said the major concern in the Lab was that, "Geez, if all these guys are leaving, the corporation isn't doing anything about it . . . . "

NGS: "Good time to jump ship."

JH: " . . . . you know, what about me?" But here the Corporation had a tremendous investment in the Lab out there. My discussions with both Charyk and McConnell and the Board indicated that they wanted to keep the place. They were proud of the Lab and they wanted to keep it going. I think the Corporation, in a technical sense without the laboratory was, not exactly a joke, but it

was, you know, it didn't have the depth that it would need to command respect in the field.

NGS: Now, how would you characterize the Laboratory's relationship with INTELSAT at the time?

JH: I think the Laboratories had a very good relationship with INTELSAT. There was mutual respect there, and you know, INTELSAT was in its very early stages. And I think they needed a lot of support from the Lab and they got it. And the Lab . . . .

NGS: Now, you're getting into the mid-'70s, and from my studies of it there started to be charges that there was loading of research at the Laboratories and an attempt by COMSAT to either support the research effort . . . .

JH: Loading? You mean overcharging, or . . . ?

NGS: Just loading of research. That INTELSAT was not allowed to go out essentially and . . . .

[Recording interruption]

NGS: Okay. Let's go back just a little bit. We were in

the midst of talking about the relationship of INTELSAT to the Laboratories. And I had brought up the issue, the loading issue. And the feeling that INTELSAT might be better served in a number of ways: 1) by putting research and development contracts not just out to other domestic research entities but also to foreign research entities. Do you recall anything about that?

JH: Well, what I recall are all of the discussions and all of the debates in the process of formulating the final arrangements for INTELSAT.

NGS: The definitive.

JH: The definitive arrangements and, you know, and the philosophy that was really enacted in the definitive arrangements. INTELSAT was to have its own engineering staff and it was to manage its own research program, and COMSAT was just another signatory that had facilities and would make major technical contributions to INTELSAT on a competitive basis. That was essentially the [way it worked].

NGS: Now, do you think that that affected the relationship between the Laboratories and the engineering

staff at INTELSAT? Because obviously, prior to that, that had really been one mission.

JH: Well, that's always hard. I think it's always hard when somebody who has worked for you for many, many years suddenly becomes the boss and you have to work for him. And that's kind of what happened in the INTELSAT case. Because COMSAT was the manager of INTELSAT for many, many years, and it was really organized and staffed and recruited people and all the rest of that to be the manager of the international system. That's the way it was set up. And that was true from Legal through Operations through Technical. It was really for the whole company. All of a sudden, it's just in a support contractor role for a while, and guys that were down in the middle of COMSAT are over in INTELSAT . . . .

NGS: Being the boss.

JH: . . . . being the boss. And unfortunately, in some cases, it was guys who kind of had a beef about COMSAT. Maybe who felt that they weren't, their talents weren't recognized as well as they might have been and that they shouldn't have been held at this low level, they were geniuses and should have been way up, and all that stuff.

Anyway, you had a re-staffing and . . . .you also had some of that attitude on the part of the International people who, for many, many years, had been dominated by the COMSAT management on INTELSAT's various interim committees. And now the shoe was on the other foot and, by God, they were really going to show who could do what.

Now, I don't think it was vindictive at all, and I don't think there was anything malicious about it. I think it was just a case of where suddenly a guy is unleashed and he wants to show what he can do.

NGS: That's right, sort of showing off your new suits.

JH: Yeah, he's got to flex his muscles and show what he can do and wants to pile up his own record. It's not that kind of thing.

On the other hand, it led to a lot of competitive feeling. You know, somebody who is used to saying how things should be and Engineering here and the Lab suddenly has to listen to somebody that he never wanted to pay any attention to. It's a bad situation. Really is a bad situation.

NGS: Well, how was that, I mean, was that not resolved? Or was it just kind of left to its own . . . .

JH: Oh, I think they just lived with it and gradually it resolved itself as people got to know one another and work with one another.

NGS: New structures, in that sense, had to be formed . . . . [Inaudible].

JH: That's right, that's right.

NGS: Now, you were at the Laboratories, you were the Director of the Laboratories for . . . .

JH: Yeah, as I said earlier, I was the Vice President for Research and Engineering for a while. And then -- I did that for I don't know how many years, three, four years, something like that -- and then the guy who was the Director of the Lab, Dr. Edelson, left to go to, where did he go? He went to COMSAT General, I guess. He had another assignment. He was ambitious to do other things and he was a good man, Burt was.

NGS: How would you characterize your relationship with him?

JH: I always thought it was pretty good although toward the end it was probably not too good because I'm not sure he was getting from me the kind of encouragement to go on that maybe he felt he should have had. But I don't, I never felt unfriendly in this sense.

NGS: Now, his directorship of the Laboratories themselves, was that something that you kind of did in tandem or were you a policy person and he was kind of a deputy, or how did that work?

JH: Well, first of all, the Lab was one of three organizations that I had reporting to me. And while the other two were smaller, they took a considerable amount of time because of the key things they did. Like, the engineering organization had all the satellite design problems, and in many respects that was more urgent and more, I don't want to say more important, but of equal importance to what the big group at the Lab did. And similarly, in some of the systems study stuff, the advanced studies work that we were doing, we were into work that, oh, looking at alternate systems for SBS, for example. Some of that was of [a] very urgent and critical nature, and I got heavily into that, too. So, I would say the Lab was just sort of like one-third of my concern in

those early years, in Research and Engineering.

Then, when Edelson, I think Burt really was straining at the leash. I think he was anxious to see the Lab flower and grow and all that sort of stuff. And it ended up where it was clear that wasn't going to happen, and I think he went on to try and do bigger and broader things in COMSAT General.

Also, at that point, yeah, almost exactly at that point, the permanent arrangements, the definitive arrangements, got put in place. And George Sampson retired, I think, and we had to reorganize to supply the services that the permanent arrangements would require. And I think at that point it became clear that, you know, there was a void at the Lab and in the case of the permanent arrangement services this is something that Marty Votaw, who at that time worked for me, could do very well. And so it seemed better to have that as a separate engineering organization that serviced INTELSAT and I'd get out of that. And I became the, I guess I became a Senior Vice President and Director of the Lab but I also still had the advanced systems work.

And, another thing, what was the other thing? It was a growing equipment activity that, what did we call it? Geez, I can't remember the name of it. McGuardy headed it for a while. Oh, I have to see an organization chart.

But anyway, it was just sort of a specialized equipment thing that we housed out in Gaithersburg.

NGS: And it was a . . . .

JH: It was almost like a manufacturing operation.

NGS: So, we had purchased it? It was a business that we purchased or we developed it?

JH: No, no, no, we formed it. We formed it. We developed it. We took people in the Lab, I took people from the Lab and had them set up, set them up in Gaithersburg. And we had a contract from INTELSAT to produce certain kinds of control equipment. I'd have to see some old organization charts to remember exactly what we called it. And I remember that a guy named Cooperman was one of the key people that we had doing some things. And then we had a Dr. McGuardy running it, and it became a, you know, it was a 5, 10 million dollar a year business. It was pretty good.

NGS: The M&S Center?

JH: No, it wasn't the M&S Center. No, no, no. No. Let

me think for a minute. See if I can remember the name of it. It was sort of like the technical equipment division or . . . .

NGS: I guess I couldn't necessarily help you. There's been so many, you know, internal reworkings and, you know, off shoots.

JH: Well, this lasted a number, and actually that in a way that was kind of a forerunner for what later became one of the Corporation's manufacturing operations. I'd have to refresh my memory by looking at the, but anyway. We did have . . . . anyway, I had the Lab and [Inaudible] Equipment Division and then the System Studies Organization. We separated out the Engineering Organization because they were largely devoted to support services for INTELSAT. And Marty Votaw was the interface with INTELSAT. And I moved out to the Lab, since that's where the bulk of the things were, and finished up out there, I guess.

NGS: And you left, then, in what year?

JH: And then I retired -- what year did I leave the Plaza, you mean? Or . . . .

NGS: No, the Lab.

JH: Retired?

NGS: Yeah.

JH: Oh, I retired on the 1st of January in 1984.

NGS: Okay. So, then, but you'd left the Laboratories prior to that?

JH: I don't think so.

NGS: Oh. Okay.

JH: I don't think so. I retired as, well, I may have stepped down a few months before that as the Director.

NGS: So, it was a good ten-year period?

JH: Oh, it was a ten-year period. Yeah. Absolutely.

NGS: And how would you say that you accomplished what it is that you had set to do in that sense? You talked about

morale being low . . . .

JH: Well, that was pretty good, I think, by the time I stepped down. I thought the Lab had a purpose and it seemed to have the support of the Board. We certainly were well-funded. Now, we had to argue and fight for money all the time but that's normal. We generally were able to do the things that seemed to be critically important.

NGS: Did you find that that issue of not being able to kind of really stretch out and do the manufacturing and getting involved in the hardware, did that continue to persist?

JH: Yeah. I found it a major frustration in a sense. The Lab had started, we started a couple of equipment businesses. One was this thing that Dr. McGuardy ran, which had to do with the development of control equipment, and largely for INTELSAT but also for other purposes. And it was a pretty good little business. And then there was another one that we started, with the approval of the Board and the R&D Committee of the Board, to take some of the Lab's products, like echo cancelers and so on, and try and manufacture those and put those out to market. And I

know I had a guy named Lou Norman working for me and we put him in charge of running this little Equipment Division. It wasn't the Equipment, I think the Equipment Division was the thing McGuardy ran. There was . . . . I don't know what we called this little manufacturing group. There was another name later, but I don't know what the early name was.

Anyway, we made some echo cancelers and got them out and sold them and that began to build up, you know, to the point where I think the rest of the Corporation felt that [that] wasn't appropriate for the Lab to do. This was something that an organization like COMSAT General should do, where they had access to marketing information and so on. So, we lost that. And we cooperated in that, you know, we transferred the people to COM Gen and so on. They were set up out in either Fairfax or McLean.

NGS: Merrifield.

JH: Merrifield, right.

NGS: COMSAT Technology Products.

JH: Now, and the idea was that the Lab would then have an outlet and the Corporation hopefully would make money from

the technology that the Lab, you know, it was the conventional way.

Well, the thing I found so blinking frustrating about it -- and even when I think back upon it now after being relaxed all these years, I could still get worked up a little bit -- is that it seemed to me that we had a very good plan and we had good equipment and we had a good start, you know, we had a good market. But somehow when it left the Lab and it left, it's almost going to sound self-centered now, but when it left our technical support ambience, that the thing went like that [began to fail]. And, you know, the sales were not high enough to support the research which was needed to make the sales higher, and the whole loop was broken.

Now, there's a basic reason for that, apart from any sense of, you know, who thinks he can manage best and all that stuff. And the basic reason is this, and it's the thing that the FCC and all of our competitors objected to, which is that if something goes out within the Lab's circle of influence, let's say, we didn't worry too much about who was paying for what. And they got a lot of free advice and they got some free development and, you know, nothing spectacular but all the little things got done. And the communal judgment was better in terms of technical proficiency and so on. And once you separate the thing

away so that then there's a formal chain, you know, so then the Lab doesn't do anything unless there's money that flows in, it kills that. It just absolutely kills, you know, the spirit of free cooperation.

Now, you can argue all you want about how that shouldn't be, you know, they're all part of the same corporation and they all work for the same stockholder and all this jazz. Believe me, it happens. Okay?

NGS: Like inter-service rivalry.

JH: It's like inter-service rivalry. So, and the thing, as I said, the thing I find so frustrating is that I thought we started two or three businesses that really I thought had excellent prospects. The plan was good and I still think the plans were good, but we got them out in isolated places out here and down the [Inaudible].

NGS: But why, I mean, just because you necessarily take it away from the place of origin, i.e., the Labs, I mean there's more to the fact that those businesses failed.

JH: Look, there's a lot more to it than just technology. I agree. You know, you've got to have marketing. You've got to have the right finance. You've got to have the

right planning. You've got to be able to convince the people with money that it's a good investment. All those great things that good managers do, you have to be able to do. However, all of those wonderful things -- like marketing isn't worth a damn unless it's got something to market; finance isn't worth a damn unless it's got something to invest in; and so on. And I think we weren't retaining the heart of the business. That's my opinion.

NGS: The "heart of the business" meaning the technology?

JH: The technology. Or the ability to markedly improve the technology.

Now, there was a lot, I don't want to take anything away from the engineering that was done in these, like in Telesystems, I guess that was the final form. They had very good people. They had people, you know, who really were capable of advanced design. But the ability to almost like to freewheel on a broader scale really wasn't there. You know, they would take a, you know, like an echo canceler, say, which was five years old or six years old, and re-engineer it, re-engineer it, reproductize it, but they wouldn't develop a new echo canceler. Or, they wouldn't look at what else does the communication community need, and what should I be working on now so

that four years from now I have a good product.

NGS: Well, now, do you think that's a reflection of a diminished influence by the Laboratories?

JH: I think it's a reflection of two things. One is that when you make a new business stand on its own two feet too soon, in other words you make it bottom line conscious too soon, you necessarily get the focus from way out to here and now -- you have to, you know, if you're going to make money next year you've got to do that. That's one thing.

The second thing is that after a while when you focus on the hear and now and are only concerned with small improvements, you lose your ability to work on the longer-range things. And, at the same time, now, you're making the bridges to the place where all this development work is supposed to be done thinner and thinner and thinner. And then the place where the development work is supposed to be done says, "Well, we're not going to do that unless you guys promise to support us to the tune of a couple hundred thou a year for this or that." And the budget back in the Telesystems, which is now getting scrutinized to find out how they can make a profit next year, isn't about to put money into long-range research and development. So, the whole thing just sort of

collapses down.

NGS: Well, I would also think that they had, that it was even more pointed in the COMSAT case because of the loss of large amounts of money on other competitive businesses.

JH: Oh, yeah. That's right.

NGS: So, it's not as if the company was doing really well in a lot of different areas and then in, say, in Telesystems that they can afford to kind of take a loss and do some long-range planning.

JH: Yeah, that's right.

NGS: So, it gets exacerbated in that sense, in this instance.

JH: That's right. That's right. And if you don't have all the parts of the loop working, the thing isn't going to accelerate and grow. And I think that, and we blew it so many times, so many times.

NGS: You mean, but not from the Laboratory point of view. You're talking about from the financial [side].

JH: Yeah, from the view of how the whole thing had to work together to grow, I think we blew it.

NGS: But do you think if the Laboratories or you specifically had had more influence in the management of the Corporation, do you think that that would have been different?

JH: I think if it had been kept smaller and the Laboratory had had a more prominent role in the subsequent application of its technology, that it could have been different.

NGS: When you say, "It kept smaller," you mean, what's "it" refer to?

JH: In the sense that if we had taken longer to, like, suppose we wanted to market an echo canceler. And we did it by forming a small group in close conjunction with the Lab and we let that grow and see what the sales were like and brought that back, got new and better products and see whether they sold, you know, use the experimental method to, and kept that going for a number of years. I think we tried to make it go too fast.

NGS: But what does that say to you, then, about the role of the Laboratories in corporate decision-making?

JH: I think the role of the Lab in corporate decision-making was very, very, almost minor.

NGS: Do you think that changed over time, because at the beginning you see a situation,

JH: It was very great.

NGS: It was huge. It was everything.

JH: It was the whole schmear, to begin with. But I think what changed it was when the management responsibility of the Corporation was diminished with respect to INTELSAT.

NGS: Okay, so you see that as kind of . . . .

JH: So, the major thing that affected the history of this Corporation was the precise task that was defined for COMSAT in the definitive arrangements. You know, when COMSAT stopped having the responsibility for the international system and became just a supporting

subcontractor . . . .

NGS: Any signatory. Yeah.

JH: It couldn't have been a more disastrous occurrence. Absolutely.

NGS: So, you think that that then changed COMSAT management how, in relation to technology? In relationship to [Inaudible] technology.

JH: Well, first of all, you know, it made the technical recommendations and technical inputs that we made into INTELSAT secondary. You know, INTELSAT was going to have its own staff and they were going to make the recommendations and all the rest of that. So, people who, as I said earlier, who used to be calling the shots were now like consultants. They were making recommendations and maybe yes, maybe no, the recommendations got accepted. That is a very, very hard thing to accept when you're used to running something.

NGS: Although, okay, but let's sort of analyze what you've just said.

JH: Let me amplify what I've said. I'm going to go to an extreme to illustrate what I mean. And this is a personal opinion. When the definitive arrangements were enacted and COMSAT was no longer the manager of the international system, and no longer felt, except in a secondary sense, any financial and technical responsibility for it, COMSAT essentially lost its mission. And it showed up not just in the technical organizations but, you know, all over the company. And it was then a company that had to look for other things to do, and that's why SBS, that's why, you know, TV, that's why a lot of things.

NGS: ERT.

JH: ERT, that's why . . . .

NGS: Scientific Atlanta.

JH: That's why the Board encouraged me to get into the equipment business, and so on.

NGS: Well, I guess what I'm getting at is I understand how that changed COMSAT's focus at the corporate level. What I would like you to explicate a little bit more is the influence, the impact of that on the Laboratories.

JH: Well, okay. Let's go into a before and after for instance. Before the definitive arrangements, when COMSAT is the manager, the Lab felt that its technical recommendations would almost directly show up in the design of the INTELSAT system. They could take pride in the fact that, you know, "The XYZ Subsystem of Satellite 2 is something that I did." The Laboratory could take strong pride in that. Okay?

After the definitive arrangements, all they could say is, "Well, we told them to do it this way. However, they did it, you know, some other way." It's a different, you know, in one case you're responsible, the corporation is identified with it, you have the monkey on your back and if it works well you take enormous pride in it, if it doesn't work well you take the blame for it. With INTELSAT in between COMSAT's just a consultant and it's a very, very different role for the Lab. Very different role.

NGS: And then let me make a characterization that you can agree or disagree with, that on top of this kind of consultancy role COMSAT is then thrown into the position of having to kind of toe that bottom line more rigidly.

JH: Well, that's true. The money came pretty easily while it was in the, you know, it was the manager of a monopoly essentially. And there were limits but it was not, you know, a major hassle all the time. Whereas, when COMSAT was put into a much more competitive role, including even competing for its support contractorship with INTELSAT, it became much more like, you know, like any other contractor in the country and there are good and bad things about that. There are always good things about being money conscious and being efficient and economical and all those wonderful things, but the bad things are that you no longer can do the exploratory stuff that you used to be able to do, and it's a much more limiting role. Much, much more limiting role.

NGS: Do you think that that had a negative impact on the S III and IV at the Laboratories?

JH: Oh, I think so. Very definitely. Very definitely.

NGS: Do you think the Laboratories can, and at the time that you left, which really wasn't that long ago, could attract the kind of topnotch talent that . . . .

JH: Well, they have. I think we got, I got John Evans to

become the Director, who is pretty topnotch, and there are other people that I know he's been able to hire since, some solid state people and so on. I really don't know how they're doing out there.

NGS: Yeah, no, I must meant from your time.

JH: But from my point of view, they still seem to have a good reputation and they seem to be able to still get good people.

NGS: To what do you attribute that? Given the scenario we have just outlined.

JH: Oh, I think there must be some continuing programs out there that are interesting to the people. My impression is that the health of the Lab in terms of growth versus decline is not good. That the Lab is generally declining in population. I don't know of any new programs that they have or new things they've done. You know, they might still be living on some of the older programs.

NGS: Did you know that there was a move afoot to try to sell the Laboratories?

JH: I didn't know about that, but I recommended that many years ago, as a matter of fact.

NGS: Why would you have recommended that?

JH: Because it was clear that, well, I shouldn't say it was clear, that I felt that if the Corporation was uncertain about its ability to support the Lab and is uncertain about its need for the Lab, that the Lab at that time was a pretty viable organization of something like six or seven hundred people. I think it's probably got about half that many today. It had an international reputation. It was highly regarded, all the rest of that, and I strongly believe that if you weren't going to keep it going at that level, if you weren't going to maintain it, then for God's sake sell it to somebody who could use it before it simply deteriorated into what would become a valueless asset, except for the real estate. And well, for various reasons that wasn't a very popular,

NGS: When would you have recommended that?

JH: Oh, I never write it down, but I did,

NGS: But just your thinking?

JH: I can remember talking three or four years before I left, I would say.

NGS: So say late '70s?

JH: Well, maybe '80-ish. You know, when it became clear that we were beginning to have, when there was a lot of pressure on, I forget what we called it, the general research budget, it was the chunk of money that we, jurisdictional research, I guess, which represented, you know, relatively free money, "free" in the sense of what the technical objectives were supposed to be, when it became apparent that that was going to decline under pressure.

It was also a rate case that came along . . . .

NGS: Well, there was the '78 rate case.

JH: That came along at that time and the outcome of that was kind of dismal for the Lab.

NGS: That was not. It was not.

JH: Was not helpful.

NGS: It did not benefit the Corporation.

JH: Yeah. Yeah, that's right. We lost, I thought that the Corporation lost a number of key battles. I felt that way then and I feel that way now.

NGS: Like?

JH: I think the rate case could have had a better outcome. Much better outcome.

NGS: Although, according to John McConnell, the fact that he was able to delay the final resolution of that by four years, he felt was about as good as you were going to get.

JH: Well, that may be true, but, that may be true but, you know, the bottom line is that the outcome wasn't beneficial. Yeah, I don't want to criticize anybody, but I'm simply . . . .

NGS: I know. But I guess things could have been worse I guess, in my mind.

JH: They may have been worse, but they weren't good. It was not a good outcome. And I think it could have been a lot better.

That was one thing that I think had a bad impact on the Lab. Not right away, but over . . . .

NGS: But just over a period of time.

JH: . . . . over a period of time.

NGS: Trickle down.

JH: Really bad impact on the Lab.

NGS: Yeah. Because of the drying up of funds.

JH: That's right. Well, once you begin, you know, a Lab is a good place as long as it's got some significant portion of its funds in self-directed money. Now, if it gets all of its funds in contracts where, you know -- it gets 200K to do this and 300K to do that, bunch of tasks -- then the person that's directing the Lab who's no longer, or the people who are directing the Lab are no longer the Lab management but they're the people who write the specifications on the contracts. They're telling us

what to do. Okay? And that generally was somebody in INTELSAT.