

ORAL HISTORY TRANSCRIPT

HENRY E. "PETE" CLEMENTS
INTERVIEWED BY CAROL BUTLER
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BUTLER: Today is August 31, 1998. This is an interview with Pete Clements for the Johnson Space Center Oral History Project. The interviews are being conducted in Melbourne, Florida, by Carol Butler.

Thank you again for agreeing to participate in this project with us. We really appreciate it.

CLEMENTS: You asked how I got involved with NASA. I graduated from West Point in 1953 and went subsequently to MIT [Massachusetts Institute of Technology], graduating there in 1958 with a master's in aeronautical engineering, specifically in instrumentation, and was assigned to the Patrick Air Force Base [Florida]. At Patrick they assigned me to a communications element of the range, as it's called, and I worked for several civil servants there, very competent people, in communications.

So my initial step into the Air Force from MIT was as a communicator at Patrick Air Force Base, and I spent a lot of time worrying about communications problems up and down the range, which consisted of many stations from Patrick Air Force Base down through the Bahamas, through Grand Turk down to Puerto Rico, Antigua and Ascension Islands. The communications in those days was a submarine cable that went from Patrick Air Force Base down to Puerto Rico, and communications to the other stations was through high-frequency radio.

When NASA came on the scene, my first interface with them was about 1959 when Mel Goff was the only NASA representative here at Patrick, and I worked with him for some communications needs that he had at that time. Then the Mercury Program was in its infancy

and people from Langley started to appear. They came in two groups. One was the operations people, primarily the Walt [Walter C.] Williams and Chris [Christopher C.] Kraft [Jr.] people at that time, and then the instrumentation people, which I think were subservient to Walt Williams, and the man most notable at that time was [G.] Barry Graves.

When we first came to Patrick and set up at the Mercury Control Center, which was a contract to NASA under Western Electric, as I recall, they used the support contractors here at Patrick, which were Pan American and RCA. Pan American and RCA provided the people to operate the control center, Mercury Control Center. Western Electric with Bendix field engineering provided the services at the various sites around the world. As I remember, there were about seventeen of them at that time.

Since I was a communicator, I was kind of invited into the Mercury Program to help provide the communications operational support. They had a console called the Network Status Monitor which, interestingly enough, sat adjacent to the flight director, who at that time was Chris Kraft. So I got to know Chris very well. We did become good friends professionally and socially.

As the Mercury Program started its simulations, it was interesting that the group would come out of Langley and they would be housed in various motels which weren't very many at that time, and they would all show up at the control center and they would run simulations and, as a result of the simulations, come up with better plans to operate the Mercury vehicle.

I remember that one of the dictates of the simulation was that the Network Status Monitor, whom I represented, would gather all the data from the remote sites after the simulation to see what problems that they had, and that data always came in after the simulations. So I would begin before the simulation, and if there were many simulations that particular day, I would go through all of them, and then at the end of them I would wait until all these reports came in, and gather them up and summarize them for the flight director,

which is kind of interesting, because since I was the only person doing that, I arrived whenever the simulations began and it was three or four hours after the simulations were over. And it was not unusual that the next [day's] simulation was going to begin in a very few hours. So I spent a lot of time going back and forth to the Cape in the very little time [between simulations]...for the period of time that they were simulating, not getting a heck of a lot of sleep.

The Air Force provided to NASA a little group of people. There were about five of us at that time under Charlie Abbott, who was a lieutenant colonel in the Air Force, and we kind of interfaced with NASA. NASA has subsequently provided a man representing the operations people, Bob Harrington, and a fellow representing the instrumentation people, and that was Jim Satterfield. They were the NASA people on site that actually lived here, and we provided the interfaces, our group, which was called the Department of Defense manager for manned space flight, originally manager for Mercury.

That little office grew to provide all the DOD [Department of Defense] support. They would be the point of contact for NASA to determine various things. The Navy, of course, provided a lot of [ships]...in the recovery area, and although this little office that I mentioned did not provide [ships]...and did not order the Navy around in the sense of the operation, it did provide a ready interface for all of these external things. For example, the White Sands Missile Range, which was one of the tracking sites, was run by the Army. The Point Arguella site was run by the Navy, and the down-range sites here were run by the Air Force—actually run, I should say the Air Force was the manager. The Pan American-RCA people provided the actual support.

I was here from the very beginning of the Mercury Program through about Mercury-Atlas 7, as I remember, and worked on all of the flights as a network status monitor. Interestingly enough, NASA was very accommodating to me. There was a little friction, I think, much higher up in the sense that the Air Force, I think, always felt that they should be

the people in the country that ran those kind of programs, and NASA, who had gotten the job, was conscious of the fact that there could have been a little bit of friction. I think this little office that I mentioned provided much of the good feelings between the two organizations. That was my observation. Literally, I became one of the simulators, or the control people, but I was part of the group. I was always felt to be part of the group. If the group was going someplace, I went with it. If they were having a party, I was invited. It was just a very nice feeling.

Well, I had spent at that time maybe three years or so at Patrick Air Force, and the Air Force routinely moves people, and they thought it would be a good idea that they move Pete Clements to Ascension Island to be the commander of that activity of the Ascension Islands. Ascension Island, if you're not familiar with it, is way south in the Atlantic between Brazil and Africa. It's 5,400 miles from where we sit.

BUTLER: Quite a ways.

CLEMENTS: In those days, there was only one base commander and that was the military person, and the other people were all the Pan American-RCA people. It was not one of the biggest thrills that I was looking forward to, but as it turned out, someone mentioned that Clements was meaningful, if that's the right word, to the program, certainly would be more useful to the space program than to sit on Ascension Island for a year. How it came about is probably through one of the original NASA people here, Bob Harrington, talking to Chris Kraft, who subsequently talked to NASA headquarters, who subsequently sent a letter to the Air Force requesting that I be assigned to NASA, and the Air Force agreed.

So when the Mercury Program moved to—or really when the control center was moved from here at the Cape to Houston, I was invited to go along with it. Interestingly

enough, I'm probably one of the few people that has worked on the two manned spacecraft control centers, the one here at the Cape and the one at Houston.

So we packed up and moved to Houston in 1962, and initially I was with a group of, again, communicators, and was a little mystified about what I was doing at that time, because we were not actively simulating, although the Gemini Program was about to come on course.

One day Dr. Kraft leaned on the door to the office of about six or eight people that I happened to be in, and he said, "How would you like to be my technical assistant for Gemini?" which I thought that was a marvelous thing. I hadn't the slightest idea what it entailed, but—

BUTLER: But it sounded good.

CLEMENTS: So I moved over to his staff as a technical assistant for Gemini, and I think the principal job that I can recall in that period was the interface between NASA and the range safety people here. Range safety at Patrick Air Force base is made up principally of military people. As a person that had come from Patrick Air Force base, it seemed logical, I think, to Kraft that I could provide this interface, and plus I knew all the people on the range safety side, having worked here as a military person.

So actually I think it came out fairly well. We had a good working relationship with the range safety people, and although they are kind of a unique organization, if during a launch the vehicle is not going at the planned trajectory and is endangering people in the vicinity, either on the Cape or external to the Cape, range safety has the requirement and, in fact, the duty to blow up the vehicle, so that it's not a fly-by-night responsibility, it's very important.

Well, we managed that fairly well, I thought, through Gemini, and I would come down to the Gemini launches here and did travel with the NASA people, Chris Kraft and the

people that were interfacing with Martin Marietta at the time for the Titan Program...we interfaced with some of the military people on the West Coast.

Wasn't too long after I was a technical assistant to Chris Kraft that he called me in one day and said that he was going to be assigned the completion of what was then called the Mission Control Center—it's called the control center—at Johnson. It was under construction, there was a lot of boxes and things around, and it was being run by a fellow by the name of Barry Graves, whom I mentioned that at one time had been a principal at Langley [Research Center, Virginia], who was then in charge of the construction of the implementation of the control center.

Chris said that he had been assigned that, and he had talked to a fellow by the name of Tec [Tecwyn] Roberts, who was a fellow out of the operations group. Tec has since died. He had a serious physical problem with living in Houston. Chris offered him the job of heading up the Flight Support Division, it was eventually called, and I think Tec just could not take it from a physical standpoint and wanted to get out of the area, and subsequently went up to Goddard Space Flight Center and became a principal there.

So I had the Flight Support Division. It's interesting, as a military officer, now NASA had other military officers assigned—not all the astronauts, but many of the astronauts were military officers. A couple of the doctors were military officers. [John A.] Shorty Powers, public affairs at one time, was lieutenant colonel in the Air Force. There were other military people around, but I was kind of unique because I was not assigned there as a specific person, I was assigned there as a worker, if you will. I used to call myself a Hertz rental.

As a requirement to the Air Force, I received notification that, "Since we've got you down there, you are to write a letter to the Chief of Staff of the Air Force saying what you're doing." So I wrote a letter to the Chief of Staff of the Air Force, at that time was Curtis LeMay, a rather famous person in the Air Force, and in it I talked about my experiences in the Mercury Program and how NASA had gotten to the point of flight control of a manned space

flight. Now, bear in mind the Air Force had been running all kind of things much longer than NASA was ever formed, and they had control of flight control, of SAC, Strategic Air Command, airplanes, and they knew all about flight control. But my observation, even as a military officer, this was kind of unique in talking real-time to an individual who's under great stress during the launch and whatever. It was all relatively new.

So I wrote this lengthy letter saying that, in my opinion, NASA's ability to flight control was not born effective, it grew effective, and by that I meant that it started out pretty chaotic, if that's the right word, in trying to do all the things that needed to be done in observing the vehicle going into orbit or lifting off the pad and all of these things.

I kind of summarized by saying I thought it was very strange that the Air Force did not take advantage of this experience since they were going on to the MOL Program, Manned Orbiting Lab Program, and didn't seem to be too interested in participating, although they were periodically now assigning some officers to NASA. Now whether or not that was the reason, I'm not certain anymore, but suddenly the Air Force agreed to assign a fairly large number of Air Force officers in particular to the Johnson Space Center. I've forgotten the number right now, but NASA was busy trying to expand. They were hiring people from everywhere. If anybody had some instrumentation experience or space experience, or whatever was available and could be gotten at a reasonable cost, so to speak, they were being hired as civil servants.

Well, now suddenly we had the opportunity to go over to Randolph Air Force Base over in San Antonio to go through a bunch of Air Force dossiers and select out the people that we wanted, and we must have selected, I'm guessing now, eighty comes to mind and a bigger number comes to mind, and I couldn't tell you exactly what it is, but there's probably someone at Johnson who will remember. George [W. S.] Abbey, for instance, eventually became one of them under a different program. I think he actually got hired through General [Samuel C.] Phillips. He was not in the instrumentation group that we were working with.

But in any event, we got many Air Force officers, and they fit right into our group. I had many of them in the Flight Support Division. Some of them were brighter than the people that we had running the business. It was not unusual to find an Air Force officer in charge of a bunch of civilians and, alternately, Air Force officers working for various civilians.

In running the control center, several of us, I couldn't tell you exactly who came up with the idea, although I would give it to a fellow by the name of Lyn [Lynwood C.] Dunseith, that we were pretty far along in instrumentation in the control center, and then the question was, do you think you could run the control center at Houston at the same time you ran the control center at the Cape [for the GT-3 (Gemini 3) mission]? I was enthusiastic about it, and we did quite a study. The question was one of safety. We certainly didn't want anything to happen badly. Alternatively, it would be an opportunity to be kind of a backup to the Cape, and if things went badly, we could probably just pull the control center in Houston off line, or at least not use it and use the control center at the Cape.

Well, that was a selling deal that we had to do. Eventually I can remember going before Chris Kraft, who was key to the thing. It was interesting that the most conservative aspect of it which we did not think was going to be, it turned out to be IBM, and the most gung-ho turned out, at that particular moment, to be Philco-Ford. We thought it would be reversed, because Philco-Ford had so many items of instrumentation laying all around the place that we feared whether or not we could keep it all on line and working properly.

Well, we went ahead and Chris got a hold of George [E.] Mueller [at NASA Headquarters] and told him this is what we want to do, and George Mueller said, "Well, in effect, you all know what you're doing," and we believed that we did and we went ahead and we used it, and it was very successful.

If you're looking for an anecdote, I can tell you one. It's a sad one in a way. We had the Air Force officers out to what was called a dining-in. This is a formal activity in the Air

Force where you wear your uniform and a bow tie and all, and you're pretty and your wives were all there. We were out at Ellington Air Force Base, which was active at that time. We got a call about the problem with Apollo [1]...and the fire. Just prior to that, the control center had—we were capable of at the control center at Houston of sending commands which would be received at the Cape, and we were simulating between Apollo [1]...and with Johnson Space Center. The immediate question in my mind was when we found out that there had been a fire in the capsule, was what caused it and did we send inadvertent commands to the capsule, to the vehicle, to anything that might have caused something.

So I did not know. As I say, I got notified at Ellington, and I got in the car, left my wife behind, and drove right to the control center. As I pulled up, the fellow who worked with me, fellow by the name of John Ferer, was running out of the building, and in effect said we had not done it. But I'm telling you, it was a frightening twenty, thirty minutes from Ellington that night. Not that we were sending the kind of commands that could have done something like that, but we had a big activity that none of us fully understood, but, as I say, it was a frightening moment.

In any event, I was in charge of the Flight Support Division up until about 1967, which at that time [I] had five years with the Johnson Space Center. And the Air Force, in effect, said, no more, five's enough. So I came back to Patrick here and worked in the same office that I had left five years prior to that. Only because of NASA's influence and because I think there was a certain amount of respect and whatever, they promoted me from, I think, from captain to major, to lieutenant to colonel. When I got back here in 1967, I was notified I was on a list for full colonel, and because of all this I was probably the first one in my [West Point] class that was going to get to full colonel, but never having combat or anything that serious. So they were gracious along that line, and I was anxious, I was going to be the first non-rated [not a pilot] chief of staff of the Air Force or something, whatever I was thinking at that time.

So I was back here at Patrick still working interfaces, now on a higher level between Department of Defense and NASA, and in particular with the Johnson Space Center. While here, I was selected to attend the Industrial College of the Armed Forces [ICAF], which is one of the two principal senior schools in the military. So I went through the Industrial College and was assigned to the Pentagon. I graduated in '69, I was assigned to the Pentagon, and immediately, for many reasons, I decided that my goal was not to stay in the Air Force and asked to resign, retire, and this I did in 1971.

I was immediately picked up by NASA, NASA headquarters. I guess I was at a job at NASA headquarters for three days and I had a call from George [M.] Low, who was then a deputy administrator. [He] called me over and said, "How would you like to do for me what George Abbey was doing for me down at Johnson Space Center?" when both Low and Abbey, of course, [were]...there at the time.

I said, "Well I'm directable. I'll do whatever." So he had me interview with the then administrator of NASA, who was Dr. James [C.] Fletcher, and the first conversation with Dr. Fletcher was, "I've already looked into your background and you're the one I want to work here, work with me. Secondly, I don't know what George told you, but let me tell you what I want you to do." He [Fletcher] says, "You know NASA and you know the Air Force, and I've been away from the Air Force for some time." He had been selected as the administrator of NASA out of the University of Utah. He was the president of the University of Utah. He says, "I know you know the Air Force, and I know you know NASA, and I don't know either, and I don't know civil service. What I want you to do is just be with me."

So, for four years I—"be with him." We did literally everything together. I mean, anytime he went someplace I went. Any meeting he went, I went. I would provide whatever detail, rundowns, whatever problems he felt he had. It was a good relation, except I had then spent four years now driving from Laurel, Maryland, down into the Washington area, which was just getting to be horrendous for me. So I asked him one day, I said, "I'd like to transfer."

Incidentally, I'd become relatively close with George Abbey at that time, and George said, "Pete, if you want to come back to Johnson, we'd be happy to arrange it."

I said, "Well, I think I want to do that, and I would certainly appreciate your willingness to let me do that," but I had to break away from Dr. Fletcher.

Dr. Fletcher graciously said, "Okay." As a matter of fact, I had a good friend up there, an ex-classmate that I introduced him to, and I think Ed Andrews provided the kind of help that I had provided, whatever that was.

So I went back to Houston in 1975, and initially I worked for a fellow by the name of Bill [Howard W.] Tindall [Jr.], who was kind of the head of the operations thing as it was set up at that time, and I worked there several months, I suspect, or thereabouts, and then Chris called me in and said, "I'd like you to take this job that George Abbey had at that time," and George was going to be made in charge of flight operations at that time.

So I became technical assistant, I think they called it, although I'm not certain of that, and then subsequently some years later they changed the job to associate administrator. I did all kind of things, good and bad, and worked principally for Chris Kraft, although the assignments I had could be from anybody and on any subject. One that I remember in particular was kind of interesting, and that is Sig [Sigurd A.] Sjoberg, who was then the deputy center director, came in the office one day, and he said, "You know, we're in a down time now. Skylab is over, ASTP is over." Do you know those terms—ASTP? "Apollo Soyuz Test Program is over, and we've got all these astronauts sitting over there and they're not doing a heck of a lot. We're not going to fly for a while with shuttle." He says, "Why don't we figure out how many of those astronauts we can terminate or turn into work in other jobs." So he says, "How about making a study and tell me what you find out."

So I made a study and concluded that we didn't have enough. [Laughter] When I laid that on Sjoberg he said, "I give you one little job, and you come in with the wrong answer." I then worked with Jay [F.] Honeycutt, a name you probably know, and I believe that Bob

[Robert L.] Crippen may have had something to do with it. In any event, Jay and I worked rather closely together, and I went over the data that I had with him, and I think he became a convert that the problem was that come shuttle, you don't have anybody trained on the shuttle, but you're going to have to train them all, and you've got X number of years before you get there, and then you've got X number of years of training, and you don't know what the astronauts are going to do on the other side of the actual flight. I mean, are they going to want one flight and go home, or they want ten flights, or they're now fifty-five years old? There are all kind of variables in there that you can play with.

Jay Honeycutt and I played with those variables for some period of time and concluded that you had to have more astronauts. Well, that wasn't received very well by anybody, but particularly not with Sig, who thought that you're really going to screw up the world. Sig was a bright guy, but it just was not an answer he expected.

So anyhow we worked that, and I can remember Jay and I went to NASA headquarters, and, of course, we had done so much leg work on it that we were now completely convinced that you'd better hurry up and get some people in here, call them astronaut candidates, call them what you want. We went up and made a presentation to NASA headquarters. Jay made the presentation and he did an excellent job. As I said, we were at least enthusiastic about it, and I think we left there with certainly the go-ahead to start getting into this thing seriously.

It fell really to George Abbey, who came up with much of the planning, along with personnel and public affairs and those sort of people, to figure out how to do this. Well, when it was announced we were going to go out on the street, so to speak, and get applications, well, it turned out to be a public-affairs bonanza, you know, there was enthusiasm all over the country of how to become an astronaut. And not only male astronauts, but female astronauts. Well, I can take some credit in there, in not doing the job that Sig asked me to do.

So I worked there, and Chris retired in whenever it was, I'm guessing somewhere around '82 or so, and a new center director came in, it was Gerry [Gerald D.] Griffin. I had been there from '75 up until that period of time, and I thought it was time that I moved on and suggested that I do something. I probably even had time enough to retire at that time.

But in the meantime, the Air Force had gotten involved in the shuttle and they were going to build their own control center up in Colorado Springs. I became an interface with the Colorado Springs people, the Air Force people out of Peterson Field. I forget the name of the building now downtown. So I ran into Gerry Griffin one day, and I said, "Wouldn't it be a marvelous idea if we had a NASA representative with the Air Force [at Colorado Springs] that knows something about the Shuttle Program? I think I'm a marvelous person to choose." So he agreed and we sent me.

So I went up to Colorado Springs in '84, and I provided a lot of interface with the Air Force there. They were very kind to me, really just very pleasant all the time, appreciated, I think, the interface, appreciated the interface with NASA, and appreciated that I could provide them with the right names of the people they needed to talk to at Johnson Space Center or NASA headquarters, or wherever. So the whole thing was a very, very pleasant two years for us.

Then in January of '86, we had the *Challenger* accident, and with the *Challenger* accident, President [Ronald] Reagan called Jim Fletcher, who was vacationing in Spain at the time, and told him, in effect, that, "We need you to come back to NASA and see what's going on with the agency," or what's going on with the operation, or whatever the right words were. Fletcher, in effect, said he had no choice, that he [would] come back to NASA headquarters.

So when he got back to NASA headquarters, I don't believe they had an administrator at the time, either that or—oh, they had [James M.] Beggs, that's right. Beggs was under some kind of cloud because of some work that they alleged had been done—incidentally, that

cloud all faded away—but Beggs was kind of not in the administrator's office. There was a deputy administrator by the name of Bill [Dr. William R.] Graham.

As the tragedy was going on and the people were going through the various stages of mourning and everything, it was not only a sad time, but a very confused time of what was really being put together. So Fletcher was there, and some of the faces were old faces that he hadn't seen in some lengthy period of time and others were new. So he called me—when I say he called me, I think someone else called me, and I later got a hold of him, and he said, "Would you come back?"

I said, "Well, I believe so," and I discussed it with my wife, and she was packing that afternoon. Our children are up in the Baltimore, Washington, Virginia area.

So I agreed to come, and then a fellow by the name of [Willis] Shapley, who had been there at the same time I had, he agreed to come back. I don't recall if there were any others, but in any event, came back and we had a little powwow, what needs to be done, etc., and etc. There were a lot of rumors going around, a lot of recommendations were being made by various people. Chris Kraft was not there anymore. I don't think [Dr. Kurt H.] Debus was there anymore.

In any event, the question of replacing the center director at the Kennedy Space Center, there was a fellow that very much wanted the job. I know I know his name very well. In any event, he was an Air Force three-star general and a good friend of mine whose name—Forrest [Lt.Gen. Forrest S.] McCartney. He wanted the job, and Fletcher asked me what I knew about him, and I told him. He says, "Well, that compares with what I found about him," and he elected to hire him and two or three other people that came in at that time. George Rodney. The names get away from me right now.

But in any event, we seemed to be getting control of the situation and it seemed to be going very well. We had some good launches, we didn't have any more accidents. The people were in place. There was some kind of witch hunt against some people at Kennedy,

some people at Hunstville, Alabama, which I think died kind of a natural death, although some people were replaced.

I would say after a year or whatever, I would say about a year later, things started really falling in place and launches were again resumed and we got very comfortable with what was going on. Fletcher at that time felt like he wanted to go back into retirement, so in 1989—he kept telling me that he was going to do it, but I kept telling him, "Wait." He was older by about five years from me, and I already had plenty of time to retire. But anyhow, he said that he thought that it ought to go in younger hands.

So he left in 1989, and I was there kind of questioning what I should do, and Dick [Richard H.] Truly came on the scene. Dick Truly had his own way of operating, as everyone does, incidentally. It's not a question of the right way of operating or the wrong way of operating. It's everybody has their own technique, and I wasn't going to fit into that. So I decided I'd go ahead and retire, and Dick said, "Well, why don't you go back to Houston."

I said, "No I think Mama has had fourteen years total in Houston and I think that's about all she can take." Just in passing, I said, "I would probably not mind going to Kennedy."

He said, "Well, we'll make that happen."

I said, "Well, you know, I don't know if you can make that happen. I'm the same rank as the center director. You'd have two ranks of the same."

He said, "Oh, don't worry about that." So we decided we'd come down to Kennedy and give it a whirl, because I wasn't really interested in retiring at that time. So we came down here and we were running around trying to find a house in Merritt Island and Titusville, which is up the road here, and we weren't finding anything. Finally, I think the tenth day or so of our two-week spiel to find a house, we happened to come in this area, and my wife says, "I don't where you're living, but I'm living in here." So we had to do something quickly, and we bought this house. It had been a model house.

Then I got notified that I had cancer of the prostate from Walter Reed [Hospital]. So we were closing on this house, and I got what appeared at that time a very, very serious situation. So we went back up to Maryland. I got operated over at Walter Reed, and apparently it turned out fine, although I was in the hospital, I think seventeen days because I couldn't stop doing whatever they didn't like, physically, that is.

After that, we came back and we had this house. I worked out at the Cape working with [Robert L.] Crippen, who was the director of operations, or whatever, for the Shuttle at that time. Of course, we had a marvelous interface because Crippen and I we were certainly professional friends. But the only problem with that operation is, you're incontinent and wearing your dydee, and I was wearing dydees. The situation they told me at the time could cure itself in a month or three months or six months or a year or never. Well, it was probably three months or so, and I was still running back and forth to the potty, so I decided to retire, and that I did.

And that's Henry Clements almost from beginning to end.

You asked me to comment on Chris Kraft. Chris Kraft, without question, is one of the best leaders that I've ever worked for. He's very technically qualified, very decisive, very bright. I had nothing but good things about him, although I'm aware that other people would say, "Hey, hey, hey, you know, he shoots from the hip, does this or does that." But I've worked for him for a long period of time, and I was aware of two characteristics, in my opinion, that differ him from a lot of leaders. One of them is that Chris could be made to change his mind on good data, on changing data. How to put that other than to say that I often spent time with Chris trying to reverse a decision that I had to demonstrate that I had gotten more data somewhere that certainly made the decision that we were making not necessarily the best or maybe not wholly the best, and he would change his mind based on new data.

Now, you get a lot of hard-head generals or hard-head people that once they have positively made a decision, there ain't a damn thing you can do to reverse it, and that's bad, because people are afraid to talk to people, afraid to go to the leader and say, "Hey, on the data you had, the decision you made may not be the best one." If I had any rapport with Kraft at all, I could go to him, and often did, with situations that he had just not gotten all the right skinny on.

Another aspect of Kraft which I always admired is that you could make a professional mistake with Kraft and not die as a result of it. If you are honest and if you just flat out made a mistake—now, you couldn't make a lot of them. Don't miss what I'm saying. But you would not be hung out to dry or to die because you made a mistake. He was very tolerant of mistakes. Now, he didn't want them to happen, but he was understanding of them, and a lot of people are not that way.

You know, usually when something happens, the first cry in today's environment is, "Who did that?" And you spend so much time trying to find out who did it that you could go fix it and then look at what the problem was. I used to take some pleasure when somebody said, "Well, who did that?" I used to say, "Pete Clements did it. Now you know who did it. Now how are you going to fix it?"

But Chris was tolerant of mistakes, and, as I say, if you made too many of them, you wouldn't come back to the meeting. The other thing in NASA, in general, was that everybody, didn't make any difference what your rank was, could pop up with a suggestion or with a comment or with criticism or whatever, and it was, by and large, very well tolerated. In the military, you don't do that very easily. There's more of a fear of the leadership. There are two sides to that story. You want everybody giving their opinion, you know, and where the general has to make the final opinion. You want to get all the data in, but by the same token, you don't want to be argumentative with a lieutenant that refuses to shut up about it.

In NASA, the meetings, I used to be awestruck as I'd look around and see these people popping up with criticism or comments to the leadership, and they took it, and it was refreshing because NASA was kind of unique in it had very many young people when they started out. When you start out with the control center, you look out over the control center, it looked like a high school class. Chris was probably, I'm guessing now, he was probably about thirty-seven at the time Mercury started, I was probably thirty-five, and Dick Roberts was maybe a few years either way. Bob [Robert F.] Thompson was probably thirty-five. But in some of the lesser—not the lesser lights, but the people that were not flight directors and these things, were mid-twenties maybe. Glynn S. Lunney was an outstanding example, a very young man, very high ranked.

I don't know. Did you want to ask me questions, or do I rattle on here some?

BUTLER: I can ask you a couple questions. You just spoke briefly about Chris Kraft and some of the others. Is there anyone else that you particularly worked with? I know you worked real closely with Fletcher. Other outstanding individuals, I guess, would be the question.

CLEMENTS: I worked with George [Abbey] quite a lot. George and I had a little competition going in the sense that he was busy running his program. He's just a character. He's competent and he's a character, and I could get to him. Sometimes it would irritate him, but I think as much in good fun as anything. I was at an astronaut candidates' dinner one night, and there were three or four speakers, and it had gone on for a few minutes. George was on the other side of the table with his candidates who are now all just glassy-eyed, just happy with their lot. George says, "Well, now I think it's only fair that we hear from Pete Clements." Well, that was a complete shock, you know, with all these people. So I got up and I thanked George profusely. "I think you're just marvelous for giving me and opportunity

to speak, George. Unfortunately, I have nothing to say," and sat down. [Laughter] But that kind of rapport went on with George.

George was with us eating crabs on the back porch of our house in Houston many, many, many times. He's even been here. He doesn't tolerate me much anymore because I'm old and retired. George is about five years younger than I. I think he's about sixty-eight.

Another stalwart that I think of is Cliff [Clifford E.] Charlesworth, who was a deputy center director for a period of time. I always had a fondness for Cliff. I was asked to come to Houston for his going-away. I had some personal problems at that time. I really didn't think I should do that, and always felt sad about it. I didn't talk to him personally about it, and then he subsequently up and died. You know how sometimes you just—Lyn Dunseith and Bill Tindall, both of whom were mostly involved in the computing end of the business down there, were people come to mind quickly.

BUTLER: I guess another question, when you started out back in the Mercury Program, or actually back when you were just in the service, would you ever have imagined where it would all lead as you started to get involved with NASA?

CLEMENTS: No. I had been in the Marine Corps before I went to West Point, and I was kind of in the communications business in those days as an enlisted man, and it was not foreign to me to come to Patrick Air Force Base and be in communications. The Air Force had no idea that I had any background in that kind of work. I just wound up in the communications. As I sat and looked around at that time as a first lieutenant, I thought, my lord, Henry, what have you done here? You know. It's a marvelous place to raise children. You're at the beach and all that jazz, but where are you going, you know? You'd be the head communicator in the Air Force or something.

At MIT we had a number of classes about space flight. The Sputnik had gone up in 1957 while we were at MIT. We used to go out on the back lawn and watch it go overhead being tracked by—oh, what was it? I want to say Smithsonian, but it was actually being done someplace up in Massachusetts. In any event, they would tell you when it was coming over, you could go outside and see the light go [by]...and everybody was fascinated by that sort of thing.

Of course, I couldn't be more further removed than to be a communicator. We did watch the vehicles take off here. As a matter of fact, when we first moved down here, we lived in an apartment out towards the Cape; it was in Cape Canaveral. It's across the street from the old Hitching Post Trailer Court, if you ever go out A1A. My wife was out there with the then two children, and I was in working when the Polaris went up and was exploded by Range Safety, I believe. The Polaris was a solid-rocket motor, and for some reason, as I remember or as I read, it lit at both ends of this segment, which then started to spin around on the Cape and throwing all kind of smoke and fire and flames and parts. The parts came down in the Banana River, right next to the old Hitching Post Trailer Court. I called my wife, who was certainly safe at the time. She wanted to know what was going on, and I told her what I knew, and she says, "Well, as soon as you can get home, we'd like to move." [Laughter] So we moved south of Patrick that weekend. We bought a house and moved down south of Patrick. But we were here through all of that.

The Air Force used to have a newsreel kind of thing. It was just a number of clips of explosions. They called it "Toys Make Noise," and it was just one [missile failure] after the other. We had a very hard time beginning in the space business, as you may remember, or may have read, to get these things launched properly. There was a vehicle with wings they had called the Snark. Maybe you've heard about the Snark-infested waters. You've heard about that?

BUTLER: Yes, a little bit.

CLEMENTS: Well the Snark would go away every once in a while and they'd have to destroy it. Range Safety, when I was here in the late fifties, had a control box mounted up on the wall in a picture frame, and it showed all of these switches wired down in one position, and then the caption on it said, I don't know how many people have checked this box to make sure these switches were in the right position and how many signed off on it. I don't remember anymore, but the idea was that obviously your quality control was very poor, because they had recovered the thing out of a Snark with the—I got to go down range. You know, people say, "Well, have you ever been to Antigua?"

I'd say, "Six, seven times."

"Have you been to Puerto Rico?"

"A number of times, and Trinidad." That's the benefits of being a communicator, but all of it was involved in military launches, primarily. So a lot of us here had experience and were not overwhelmed by the fact that NASA had the program.

CLEMENTS: We were pleased that somebody was going to have a program and it was going to be running, and, of course, those of us that got the interface with NASA were very pleased. Marvelous career, you know, because it was the threshold of this whole thing. Now, I'm sure there'll be other more exciting and certainly maybe more rewarding programs to come, but this was the beginning.

BUTLER: I'm going to change the tape out here real quick. [Brief interruption]

Looking back at the program, and you said it was a marvelous and exciting time. Look specifically at Apollo 11. Where were you at the time and what were you thinking?

CLEMENTS: Apollo 11, I was back with the Air Force. I was in Industrial College of the Armed Forces. That was May of '68, I suspect. Not May. Was it May [that I was at ICAF]?

BUTLER: It landed on the moon in July of '69.

CLEMENTS: In July of '69, yes. I was back with the Air Force at Industrial College up in Washington, DC. Yes, I was thrilled about that. I think 11 was just outstanding, but I think the one that gave me the most fear was 13 with the, "Houston, we have a problem." We all watched that, certainly those that had been involved in the program. I watched from the Pentagon, and we all prayed that that worked out as well as it did. Certainly some fearful time for all of them. But then it got to be so routine, somebody decided not to do it anymore, which I guess made all the sense in the world to somebody, because it was very expensive. Great time.

I was thinking there a moment ago about anecdotes. There were several, probably one of which no one can tell anymore because two of the principals that were involved in it are now dead. One was John Hatcher and one was Tec Roberts. Hatcher was an RCA employee who had great talent, a young fellow. He had been an enlisted man in the Marines and he hadn't been out very long. RCA had given him quite a bit of freedom in the Mercury Control Center, and he was in charge of all the equipment in the Mercury Control Center.

Now, I was in charge, so to speak, or not responsible for, but monitoring, if you will, all of everything around the world to include the control center. So what John did, they had made a movie tape of a lift-off, one that probably—this was during the—oh, I'm guessing, probably the third or fourth flight of the Mercury Atlas. But they had one that was an actual launch earlier, and what he had done is that he timed this movie tape to a lift-off count. Kraft was running a simulation, and the only people that were in on it [were]...John and Roberts,

and I knew about it, but I wasn't in on—these two needed to know because of some work they were doing.

So we're going through the simulation, and we're T minus ten minutes and counting, and we're T minus and five minutes and counting, and we're T minus whatever we're counting, and lo and behold, we get ten, nine, eight, seven, six, we get to zero and John Hatcher flips the switch and the movie comes on and the thing lifts off and Kraft is berserk. And people are running out of the building to see where the thing is. Well, it wasn't too happy around there for a while.

But you probably can't appreciate some of the things we had to do. We didn't have PCs and all that. If you wanted a television report, say you wanted to get this out to a television in the other room, what they did, they'd have a table and they'd have a camera above the table looking down on the table, and they'd have a chart which showed you the positions of the ships for recovery or whatever the subject was. You see this hand come through and move the little things because the television is doing it. Then you just broadcast that out to the TVs out there [in the control center].

During simulations every once in a while—I had a for-sale sign, we had dachshund puppies and I'd have a man run this thing underneath the [TV Camera], little dachshund puppies for sale. [Laughter] There was some lightness in there. It was also a big board out in front of the controllers that was a world map laid out just like it is in the control center in Houston. But you had all of the sites, the seventeen sites or whatever, the Zanzibars and Guaymas, Mexicos and whatever, all identified around the world, and then around each one of those was a circle which could either be red, green or yellow. Do you know what an X-Y plotter is?

BUTLER: Yes.

CLEMENTS: You know, like what do you call those things? Anyhow, the X-Y plotter was [along] these wires and the abscissa and the ordinate and between was a little picture of the capsule. So the X-Y plotter would be fed so you saw this [Mercury Capsule]...going around in a sinusoidal way. It was physically done. And when it got to the other end of the board, the plotter would reset and this thing would come back at ninety miles an hour to get to the other end because it's got to be replaced. Well, anyhow all around the sites they'd have a block of lights and it would say "telemetry," little block. It would say "radar" if [there]...was a radar there. It would say "communications." It would say "command control." It would say whatever it did.

One of the jobs I had was a big panel of loose switches. You look at Guaymas, and his telemetry is all right, so that would be green, and his communications were not too good but not bad, and that might be yellow or whatever. So as the thing would go periodically, first of all, I had the whole summary of what was going on right now, and then as the little capsule would get near a site, I could make the light blink, the circle around it, so that it would blink either that it was capable of doing something or not capable, or marginally capable, red, green or yellow.

So one of the people, one of the technicians there figured out if you were careful enough, you could go around and light all the right lights that could spell "tilt," okay, and you could also turn all the circles on of various colors, and you could do this all at one time, especially if you had them all identified. So if we were fooling around and no senior people were in there, I could get this whole thing going flashing in various [colors]...and yelling "tilt." I don't know that you need that in your—

BUTLER: Well, sure, that's interesting. It kind of demonstrates, too, some of the differences between the technology that you had available then and what you have now.

CLEMENTS: We had no alpha-numerics. You couldn't change like you can now on the TV screen, put up A, B, C, D, E, F. The way it was done, I think it was Philco-Ford developed a thing called a charactron. Lyn Dunseith and his people would make up what was called a background slide, and it would say "oxygen," as an example. It would be a slide just like you would use in your home projector, and on that slide had been etched "oxygen" or whatever the title was, and it would just be a fixed slide.

This charactron had two cameras. One would look at the slide, and you could call up that camera on your TV in the control room, and you would see "oxygen." You wouldn't see anything other than that; you'd only see what was on the slide. Then this device could take a beam of light, so to speak, and position it through a listing of numbers and alphabet, and that beam of light could be superimposed on the background slide so that oxygen would read 70 percent, and a camera would take a picture of that, and, of course, you had to line all this jazz up.

Lyn Dunseith could tell you better how the charactrons worked than I, but they spent a great deal of time developing these background slides, and that was something. Somebody would change their mind on what they wanted to see, and you had to go in and position all the [background slides], but you couldn't just type it in like you can today.

I don't know if they still have it, but they used to have a pneumatic system that they got out of a bank, that if you wanted something from the back room that there was a printout, you could actually make a printout, if you will, and then you put it in this thing just like in a bank and you send it out to the flight director at his console, or whomever was going to get it.

Then they had a TV matrix, as they called it. The TV matrix was as if you had maybe—I forget the numbers now, but like twenty television stations [available at your console]. You could call up any one of those, and any one of them could give the same picture to the flight director, the simulation director, the whatever whatever. That was a device, I think, was developed by Philco-Ford.

All of these things were very rudimentary, but they were necessary, and it all didn't change until they came out with, or were able to do alpha-numeric, if you will, as just a routine thing. You know, you just call up whatever you want now on TV. You can get TV on your PC.

I think that it's fair to say that NASA probably did as much for IBM and the computer industry as IBM did for NASA in the computer industry. Here at Patrick Air Force Base, I think one of the first machines, very large machine, was an IBM-709. In those days, one of my neighbors was a salesman for IBM, and when they sold two 7090s, which was the follow-on to the 709, he got a commission, just like he would get a commission if he were selling an IMAX today. His commission was enough money to put in a wheelbarrow to run down the street with, because IBM, you know, very seldom that anybody was buying two 7090s.

Of course, in those days, there was a lot of estimating, if you will. To figure out what the trajectory was, you'd take two or three hits on the [capsule]...and look and see what kind of arc. It was called a short-arc solution, and you would place that against what you thought it would be and you would see if there was any changes. Then you'd quickly do it again and place that arc up against what you think it ought to be and then you would get a tendency or trajectory, if you will, of what the vehicle was doing.

I'm sure that you're aware that a lot of things that are very routine today were developed under the space business. NASA was never, ever able to really convince the world that that was so. I think intuitively it's so, but, you know, they say what did you really do? Pacemakers? Fire equipment? How did that help? But really, the reduction of size, the miniaturization of so many things that has come down. Now you've got as much power literally on your PC as we had in the control center years ago with these massive machines, huge machines. Switching machines for communications, UNIVAC was big in that end at that day.

...Our professional friends were often our social friends, especially out at Houston. That was so in the military. In the military, your social friends were generally your military peers, but it didn't work that way so much at NASA headquarters because NASA headquarters is in Washington DC, and people just don't congregate together. Now, you may all meet someplace on occasion, but going from house to house wasn't that easy to do and wasn't often done. Our friends in Laurel, Maryland, for example, in Silver Spring, Maryland, were our friends that were both in Baltimore, were our friends of many, many years, are still our friends today. We'd go over to Baltimore to meet with them. But in Houston, our friends were primarily our working friends.

As I pointed out, although I was a Hertz rental, I felt as welcome anyplace we went. Spent a lot of time in George's [Abbey] house, he's spent a lot of time in my house. Since this is going to George, I think he owes me some dinners or crabs or something appropriate.

BUTLER: We'll make sure that he follows through on that. From everyone I've spoken to, it sounds like a really neat group of people, good working relationships, friendly all around.

CLEMENTS: A lot of competence there. It was more so than you would find in most things because you had to be competent in the sense that if you couldn't do that job, somebody had to come in and do it for you because it was mostly real time.

BUTLER: Going back a little bit in your involvement with the Mercury Program, you worked on you said basically every Mercury mission up through about MA-7. So were you then working—I believe it was MR-1 when they—

CLEMENTS: Yes.

BUTLER: —did the first.

CLEMENTS: Yes, when it spit out everything at the top.

BUTLER: Yes. Can you tell us a little bit about that?

CLEMENTS: Well, you know, certainly you asked what was the most exciting thing. I had already seen vehicles blow up, so I was not going to be overwhelmed if that's what happened, but I was as awestruck as anyone because we were watching it on television, and what it literally did, as I understand it, it went up a little bit and then set back down, and [unclear] says, "You want the escape tower to go or do you want this to go?" By the same token, the escape tower took off and the capsule was putting out its parachutes and everything else while it's sitting on top of this Mercury Redstone. Of course, the Redstone had not fired, so it was still a live vehicle.

Another anecdote that I always remember, I think it was [L.] Gordon Cooper, and I can't recall if it was [Virgil I. "Gus"] Grissom, or whatever, but you didn't have videotape in those days. They had developed it, but the videotape was about a foot wide, as I remember, and it wasn't something that you carried around and played in your VCR. Quite often they'd have to send the [TV] signal out to California to be taped. That's for the launches. Now, go back to Gordon Cooper, and I believe it was Grissom, although I'm not certain of that, but [during a simulation] they were taking television pictures of these two going over to get into the elevator to go up on top of the gantry. They were both in their spacesuits, and they were about to get into the elevator and Gordon Cooper pretended he didn't want to go. So he backed away, and Grissom—I guess it was Grissom—caught on right away, and he's pulling him on his arm as if, you know, "You're afraid to go. It's time to go." This is all simulation; it's not for real. I'm sure you couldn't see that they were laughing with the helmet on and

everything, but that was one of the funniest things. If it had ever been taped and showed around—I'm certain it's never been taped because the film never was shown. But he decided he wasn't going to go.

BUTLER: The astronauts, from what we've heard, they were quite characters at times.

CLEMENTS: Yes, but brave. You didn't have an awful lot of people that thought they were all going to survive as well as they did, and it's unfortunate that it came about that some had to die. I mentioned in there that three...of them [the *Challenger* crew] had eaten at our house, so we were that close to them from a personal standpoint.

BUTLER: Luckily, most of the program was pretty successful and seems like everybody stayed pretty well on top of things to make it work and to keep those guys safe.

CLEMENTS: Well, we had two serious losses here in the last three weeks. We lost the Titan 4 and then we lost the Delta 3. Everybody, even the people that have absolutely nothing to do with the space business, were saddened by it, not by the money that's lost, but by the setback, you know. Everybody is very positive, especially in here, and I'm sure everywhere, but this man across the street, he had his nephew's son or something over to watch the Delta 3, and he came out of the house about the same time I came out and neither one of us knew it had blown up. He was telling me how happy the kid was to see a launch. And then the next day we got together and, gee, he was just way down. What is this going to do, what's it going to do?

But just living in the area, there's that kind of aura. Well, it's the same way around Houston, I mean, you go down around the space center and those people are still so gung-ho. "Let's get another one going and let's get the Spacelab working."

How long you say you've been down there?

BUTLER: In Houston? I've been down there now for just a little over a year. I arrived down there last July and the project's been going for a little longer than that. It's about two years for the project.

CLEMENTS: Is that right?

BUTLER: Yes. It is exciting to be down in the Houston area to be right in the center of the manned space flight aspects of the program and with mission control and certainly to talk to everyone about it.

CLEMENTS: Yes, you're fortunate. I know we haven't been back now in, oh, I'd say about five years. We talk about it, but we don't go.

...Been down to Galveston?

BUTLER: Yes, occasionally, occasionally. I just finished, actually, a master's degree program, so I've been a little busy with school.

CLEMENTS: Where, University of Houston?

BUTLER: Actually, no, at the University of North Dakota.

CLEMENTS: Oh, you do it by correspondence.

BUTLER: Well, actually, I'm doing it over the Internet. Talking a little about computers and the changing technology. With this program, we had classes online. We met at a normal class time. We talked with each other and the professors, and basically everyone in the program was working full time in the space industry somewhere, so not only did we learn from the professors, but we learned from each other. It's been a fascinating program, fascinating program.

CLEMENTS: Well, you're doing a lot of that now with video conferencing that really never had that advantage. They tried it a little later, ten years ago. I don't know, today I imagine it all works very well. I'm not in it anymore. But it was not very successful. You still wound up getting on an airplane and going someplace. Of course, that can get very expensive after a while.

BUTLER: And time-consuming.

CLEMENTS: Yes.

BUTLER: It takes time to fly. Yes, the space program has seen quite a bit of changes in a few years out there. Now we're moving into the International Space Station age. Were you ever involved much in your working with future programs like that?

CLEMENTS: No, Fletcher was. We met with the Russians, but we met with them over in London. He had a pretty good rapport. [Anatoly Fedorovich] Dobrynin was the Russian whatever in Washington...

Anyhow, it was an interesting story about him. One day—I'm trying to get the exact time, but I think it was 19—oh, heck, it must have been 1972 or '73. Dobrynin was cuddling

up to NASA, for whatever reason. In those days it was before the ASTP flight, whenever that was. That must have been 1975, I'm guessing. Fletcher wanted to bring him to Johnson Space Center. I had already gone, I was down at the Johnson Space Center, and I don't know if NASA 1 was going to go pick up Dobrynin someplace else, but in any event, it was Fletcher and Dobrynin on NASA 1. That's one of the Gulfstreams, airplanes.

En route, Fletcher said something about a football game at the Astrodome, and, of course, the Astrodome had been around about ten years, but I don't think Dobrynin had ever been to it. So apparently Dobrynin said, "Oh, I'd love to go see the football game." So here's Fletcher up in the air someplace. So he calls the Johnson Space Center, and they found me, and he says, "What are the chances of getting tickets to the Astrodome to see the football game?"

So we had public affairs, and I said, "I'm sure that can be done," and sure enough, we got them and we got them picked up at Ellington and taken down to the thing.

Fletcher came in the next day, just all smiles. He was just saying, "Jeez." You know, the interface with them, even at that time, was all secretive. It was kind of sad. I don't know what ever happened to Dobrynin. Well, he went back [to Russia], I know that, but I never see his name in the paper anymore. He spoke English very well.

I often tell the story about Dr. Fletcher, a very bright man, Ph.D., very wealthy man. He had occasion to go to New York. I think he had five brothers, if I'm not mistaken, and I don't recall if there was a sister involved. But anyhow, one of them was a lawyer for Western Electric. He had gone to New York to talk. I had not gone with him, because he was going to be with his brother. So he called the office, and he said, "Pete, you know—" Now he's on his way from there—he's got his ticket—to the West Coast. He said, "You won't believe this." He said, "I just left my brother. He brought me here in a chauffeured limousine," he says, "and I've got only this quarter in my pocket that I just put in this telephone." He says, "I

don't have another penny." He said, "I never thought about asking my brother for money or anything." He says, "what can you do for me?"

I said, "Well, how much money do you want?"

He said, "Well, I'll take ten dollars," or whatever he said.

I said, "Do you want a hundred dollars?"

He said, "Would that be possible?"

I said, "When you get to Los Angeles," or wherever he was going, I think it was--I don't recall. It was either Los Angeles, or he was going up around San Francisco. In any event, I said, "When you get there, there'll be a person meeting you that will give you a hundred dollars."

He said, "How are you going to do that?"

I said, "Don't you worry."

Now, he's leaving New York and he's going to Los Angeles, that's a five-hour trip. He owns Rockwell International. He owns, you know, I can name—not owns, but he has contracts with all of these people. So it was absolutely no problem picking up the phone, calling the right people on the West Coast, and he gets there and he gets off. Of course, he doesn't know the man, the man just came up and says, "I was told to give you a hundred dollars."

So he gets back to Washington. He had no idea how that could be done, you know, that here's a man that does all his thinking, he had all of his inventions, made all his money with vehicle out of Hughes, I forget—Aerojet General bought him out for, I don't know, millions of dollars. So he was a very wealthy man, but those kind of problems he didn't solve, but that's the kind of problems that you solved for him.

A very interesting man to work with. He was very obtuse, he was very rigid. Actually, he was very friendly, but I think he was uncomfortable with not knowing other people. Even though he was at the University of Utah, he'd tell me stories when he came

back to NASA how he felt, you know, he wasn't sure who was with him, because he had already made some remarks he said about the shuttle. He wasn't much for the shuttle at that early time. There was a lot of question around the country about whether or not the Air Force should have it, or if NASA made it, do they make it to fit all the Air Force's needs? The Air Force wanted cross-range, they wanted to be able to change their mind and go to land over here if that's what they wanted to do.

When I was working for the Air Force—I was helping the Air Force put all these things into NASA, but the Air Force came up with all of these requirements that complicated what NASA was trying to build in the way of a shuttle. Fletcher, I think, sometime back in the early stages of the shuttle, was probably vocal or not too much for it, so he wasn't certain what kind of reception he was going to get when he got to NASA, which turned out to be very positive. I mean, if he had any qualms about it, I think he became as much of a proponent for the shuttle as anyone.

He got some raw deals on—when he was at NASA the first time, the solid rocket boosters on the side were made by Thiokol out of Utah. He was accused of, since he was a Mormon from Utah, that he threw that business that way. Now, I'm sitting here today and tell you that it's absolutely not true. I attended all the meetings and the recommendation was Thiokol, and it was not his recommendation. I mean, he could have changed it and everything else, but he didn't come down and say, "I think it's Thiokol." I don't care what you say, it was none of that. It was absolutely not involved.

So it wound up with Thiokol and eventually it was built and strapped on the side of the shuttle, and now we've had an accident and now we're back with Fletcher in his second term as administrator, and he has to go up on the Hill to get approved by the Senate. One of the senators is Senator [Albert] Gore, who starts out with, "Well, the problem was in the solid rocket motor, and you're the ones that insisted in your previous incarnation to have it made at Thiokol," and lot of inferences that were really not deserved.

I don't remember if he was up there several days, three days, or whatever it was, but I talked to him each time. He said, "Pete, I don't know why they're doing that."

I said, "Well, it's certainly not true, and everybody here that was ever involved in that—" After, I guess, whatever the Senate does and says that the deal's on, you are now the administrator, we accept the President's recommendation. He said that Senator Gore came up to him and said, "I hope you realize I had to do that from a political standpoint." That really crushed Fletcher, because Fletcher was as apolitical as anybody, and he said, "I don't think that even Reagan knows that I'm not a Republican. I'm an Independent."

Even today there's a lot of—you know, if you're in charge of your administration, you don't want to go out and hire all the Republicans if you're a Democrat, and vice versa. He said it really hurt because the allegation had gone a long time ago, and now he just—I'm sure if the senator had to do it again, he would not have brought it up. It really hurt him personally.

BUTLER: It's a tough situation.

CLEMENTS: Yes.

BUTLER: Luckily, he was able to bring it through and get NASA back on track.

CLEMENTS: Yes, he did a very good job, I thought. We worked with Werner von Braun, if you know that name, up there.

BUTLER: Yes.

CLEMENTS: When Fletcher came in the first time, von Braun was kind of out of the Huntsville area and was up at NASA headquarters and was principally—he's so dynamic and so charismatic that he would go up the Hill and sell literally anything, I guess, you know, with the accent. Very funny man, very funny man. I bought his golf clubs, I mention in there. He didn't play golf, but he got it as a gratuity for a speech one time. I held onto the check for a long period of time and I've lost it. But he really had a great sense of humor, fun to be around, especially somebody of that notoriety. He and Fletcher got along very well, too.

BUTLER: Looking back, what would you consider to be your most significant achievement or participation in the space program?

CLEMENTS: Well, I laugh at it, but I think my conclusion about how many astronauts were required was not only the funniest, but it turned out to be really right. I got hee-hawed at a lot about that. Jay, Jay Honeycutt. Have you met Jay?

BUTLER: Not yet, no.

CLEMENTS: He's quite a card. He's a very nice man. He would laugh at it, too, until he became converted.

BUTLER: Looking at that, what would you say was the most challenging aspect for you?

CLEMENTS: Well, the Flight Support Division, I think, was certainly the hardest, because we had a great big building full of things that all had to work together, and to the credit of Philco-Ford, they really did a yeoman's job. This fellow, John Hatcher, whom I mentioned

earlier with the movie tape, he was brought over Philco-Ford and was kind of their—I think he even got to be a vice president with them as still a very young man. He died as a young man, too. But he had the feeling, I think probably because the Mercury Control Center, because that was the first big job that he was involved in, too, of how some of the parts had to go together. He and I were great personal friends, as was George Abbey, John Hatcher, and I.

John and this Colonel Abbott who was running Philco-Ford at the time, or I shouldn't say running Philco-Ford, he was running an element. There was a fellow by the name of Benware down there that was actually in charge. But they were very honest, straightforward people who were trying to do the job. It was not anybody trying to make a dollar off of the program. What they were trying to do was be successful and be safe, and they were fun to work with.

IBM, although I was very close with Sarrahan, who was their principal there, I didn't have as much to do with them or to worry about because their machine was a great big box where you put stuff in here and it came out over here. It wasn't a lot of wires laying all over the floor and people falling down into holes, I mean, literally. I remember on the third floor of the old control center—I don't know what the new one looks like now—I came around, there used to be a perimeter hallway all around the thing, and I came around a corner one day and these two doors were open, and I was unfamiliar with the building and I wondered what was down that hall. I looked out and it was five floors down [The MCC comprised 3 floors in a 5 story building]. I mean, the unfamiliarity with the business, not that anybody was being careless, but they were getting ready to move somebody up and nobody thought, well, you'd better block that off. Well, nobody's supposed to be up here anyhow, because we were up here working.

I remember when Lyndon Baines Johnson came to the control center. We were going to take him up to the third floor, and the elevators—have you been in the old control center, in the elevators?

BUTLER: Yes.

CLEMENTS: Well, if you push the button, I guess it still works this way, both elevators come down, both elevators go up. So we got in the one elevator on the far wall, and it was the President and it was—gee, it could have been the Vice President, although I'm not certain anymore. I think it was the President then, and his handlers and a couple other people. I was going to take them to the third floor and tell them something, whatever. So we get up to the third floor and we did whatever we were going to do, and we got back in the elevator, and it came down and got to the second floor and it did this, it opened that far [gestures, hands a few inches apart] and closed, and then it went back up.

Never had happened like this before, got up top, opened that far [gestures again] and closed. [Laughter] Everyone was wondering, you know, because then it went all the way down to the first floor and opened up and people got out, and I thought good Lord, you know, whatever caused that to happen? I never saw it happen on the elevators again. Obviously nobody was doing anything, the elevator just decided to give everybody an extra thrill.

BUTLER: Well, it knew there was some important man onboard.

CLEMENTS: Yes, it was scary, though, because I'm sure that the Secret Service didn't know what was going on. We used to have them come in all the time. I know that Reagan came down one time, and if you've been in the viewing room, we had it set up [for the press]. He was going to go down on the floor, and I don't know exactly what he was going to—I think his wife was even with him. This is more recent, because we never used to be able to bring visitors in from the back of the viewing room. Well, they came in the back, but you had to go

up all these steps and all that. Then later they opened up a big entranceway to the far end of the viewing room.

Anyhow, Reagan was down on the floor and he was going up the entrance to the floor, but over to where all the consoles are, and then they turned loose the press corps. Well, I've never seen anything like this in my life. It was like a bunch of animals to a feeding frenzy. They jumped over the things, and, of course, I think the first guy didn't realize it was a glass there, and he's up against the glass, and the people are just falling all over the seats and they were looking at me for fear that somebody was going to get hurt. But they can tell more stories about that sort of thing. That became a very, very popular place to visit and get briefed.

Funny aside, I was briefing the Secretary of the Air Force for Personnel, and after the briefing was over, he says—I was in civilian clothes—he says, "I understand you're a major in the Air Force."

I said, "Yes, sir, I am."

He said, "How did you get here?"

I said, "Presumably with your help." That's the only thing that came out.

He says, "Yes, probably so." [Laughter]

BUTLER: I think we've kind of covered most everything in general detail. Is there anything that you can think of that you'd like to add or that we haven't covered?

CLEMENTS: I'd like Mr. Abbey to send me some crabs. You know what he did, he sent me a piece of paper. Do you know his secretary, Mary?

BUTLER: I've met her a couple of times.

CLEMENTS: A sweetheart. He sent me a piece of paper that was dated 1986. It was a newspaper article, and it was about crabs. One of the life sciences people at Johnson had figured out the way to flash-freeze crabs and mail them or send them air mail, I mean, by plane, I suspect, to Japan or the Orient where they're a delicacy, and how much money he was making on this. I've forgotten his name. Well, this is last year, I think, and I get this thing that's dated 1986. So I write back a smart-ass letter, but she [my wife] wouldn't let me send it. [Laughter] It said, "You finally got to your 'in' basket." But I did send a questioning letter back, and I talked to Mary on the telephone. She said, "Mr. Clements, he hasn't changed at all, hasn't changed at all."

You're not familiar with the military? Your parents ever in the military?

BUTLER: Actually, my father was in the Army.

CLEMENTS: Was he? So you know what the PX is.

BUTLER: Yes.

CLEMENTS: The PX at Ellington one time sold jelly beans that were purple and white, the ugliest jelly beans you ever saw in your life. There was a big box of them, probably didn't cost more than twenty cents. So I'm big on bargains, so I took, I don't know, three or four boxes. One day I went down to his office like a child and I put these jelly beans all over everything, and he came in and he was beside himself. So when I went down there later, he had not moved a one, but he was eating them. [Laughter] Great fun. We had a lot of fun with George. Great fellow. He didn't marry down there, did he? Haven't ever heard?

BUTLER: I don't believe so.

CLEMENTS: Well, I'm sure I would have heard. He gets over here quite often, but he doesn't come by anymore. He used to bring me jelly beans.

BUTLER: Well, we'll pass it on to him that he needs to bring you some crabs and some more jelly beans.

CLEMENTS: Actually, we got crabs here. We do fairly well, but I kind of miss them over there. They were less expensive and they were good-sized. You wouldn't know, being from Colorado.

BUTLER: No, not much seafood up there, and what they do have is imported.

CLEMENTS: You've got trout.

BUTLER: Yes.

We've gone for almost two hours now.

CLEMENTS: Is that enough for you?

BUTLER: I think so.

CLEMENTS: Okay.

BUTLER: But if you're interested, if we do come up with some other small topics perhaps you could talk again.

CLEMENTS: I'd be happy to, I'd be happy to. I think George has a good idea here, and I'd like to say if they can get it on the Internet and be available to other people who might have an interest in it, that's great.

BUTLER: Great. Thank you so much.

CLEMENTS: You're welcome.

BUTLER: We appreciate it.

[End of Interview]