

NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT

ORAL HISTORY TRANSCRIPT

ELMER E. BARTON
INTERVIEWED BY REBECCA WRIGHT
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WRIGHT: Today is April 12th, 2000. This oral history is being conducted for the Johnson Space Center Oral History Project with Mr. Elmer Barton in Houston, Texas. Interviewer is Rebecca Wright, assisted by Sandra Johnson and Sandra Harvey.

Thank you, again, for coming down today to our offices to visit with us about your experiences with NASA. We'd like for you to start with us today, Mr. Barton, just give us your background. How did you have an interest in aviation, and how did this bring you into the job that you had with NASA?

BARTON: Well, of course, I grew up back in the days of the Depression when there wasn't much about aerospace or the future of aircraft or anything like that. I went into the service in [1939], and in the service I went through various tech schools and became involved in flying with B-17s and other craft.

I retired in 1968 from the service, and basically during that period I was working in various jobs in the Air Force, and became involved basically as far as rocketry and missile was concerned, was in 1956. I was assigned to a crew that we were doing sounding rockets from Wallops Island [Virginia] and was at that time stationed in Albuquerque, New Mexico, at Kirkland Air Force Base. I had been on Project Crossroads, which was H-bomb explosion and that, and we had set up some sounding rockets, testing the nuclear clouds and that.

The commander I had at Kirkland was transferred to Patrick Air Force Base [Cape Canaveral, Florida] as commander of the test wing. When he got down there, he didn't seem to feel that he had enough people, and so he, in turn, got six of us from Kirkland transferred to

Patrick Air Force Base to the test wing. When I got there, I was going to work in supposed to be what they called the inspection crew, but at that time the Department of Defense [DOD] decided they needed to have an all-military launch team trained to launch the Atlas since it was going to go into the ICBM [intercontinental ballistic missile] field, then they needed to get some experience [for] the military.

So I was a member of what we called the Blue Suit Team at that time, and I was working on the Atlas complex. I went to the Atlas complex. At the end of the Atlas D Program and during the updating I stayed there for the E&F and went through several launches, a couple of bad ones as well as successful ones.

I was a systems engineer on the Atlas, and then I became a test stand engineer. In the Atlas Program you always had one man on the test stand that was supposed to be the wheel, they called him, at the test stand. In other words, he controlled all activity on the test stand for the test conductor. He was the spokesman for the pad to the test conductor. I had that job for some time.

At the end of the test program of Atlas, [the] Gemini had come to birth, and I was asked to go over there, and I went over there. When I went over there, there was just early stages of what you and I'd call activation. So I went over there as project officer to follow the contractor and make sure that we're getting things done on schedule and making sure things were being done properly and that. So I was the Air Force representative for that.

When that ended, I was supposed to go to Vandenberg [Air Force Base], or to California. I was supposed to go there. I was going to be military representative for WDD [Western Development Division] at that time, or Space Systems Command, at Vandenberg for the intermediate for the Air Force and the contractors. But Colonel Albert at that time came aboard and took over the program, and his remarks were, "No way are you going to go out there." So I stayed [here] and I went through the Gemini.

So that basically is how I started in and how I got tied into the Gemini. As I said, please understand that all due respect to all of us, that it was really the team at that time [known as]

NASA-DOD Industrial Team. The major decisions and all that was done by Colonel Albert and his crew and with the contractor. So the contractor was Martin Marietta at that time, who had developed the Titan II. As you know, the Titan II was selected to put the Gemini astronauts into space.

It developed into what I would say is one of the finest relations between a contractor and [DoD] that you would ever see. The relation was the top. I think we could contribute that basically to Colonel Albert, because his knack was to have the best and do the best. We went into the program with not being blinded that you would always be successful; we went into it with the idea that every launch would be a success. That was our theory, and I think this theory is what made the astronauts become very confident on launches, that we've had no fear. We used to say, "We're going to make it."

If all of you understand that we start out with twenty-one vehicles, and when we got to number twelve we had met all mission objectives, so they canceled the others to save money. During those missions, we only missed a launch schedule [once], one launch schedule was missed, and we weren't on time, so it was a pretty successful program. That was on [Gemini] VI, when VI shut down prematurely.

So I think you could attribute it to the responsibility that was placed on each individual. You can attribute it to a team. I mean, the civilian side of the house and the Martin Marietta [Corporation], and the military, laid aside all their feelings and worked as a team and a crew that made it very successful.

It was successful enough that this was something that Gus [Virgil I. Grissom] and them missed when they went to the Apollo Program, missed it very deeply. Gus spoke to me several times about [did not] have the continuity and the communication relationship, the day-to-day relationship they had experienced on the Gemini Program, but everybody understood that NASA was new and NASA had their own basic way they're going to operate. So everybody had to

accept that. I think you can, as I say, attribute it to the team. You're going to hear about the teamwork.

If you get to know people and know how everybody works, why, it makes it easier. Everybody on that complex, down to the janitor, was respected. I mean, the janitor was the man that had to keep the white room perfectly clean and he was respected as part of the team, and didn't look up on him or down upon him because he was a janitor. I mean, everybody was part of the crew developing the atmosphere of working together.

WRIGHT: How did your role transfer? You said you were the Air Force representative during this time. Can you give us some examples and some details of what that responsibility included?

BARTON: Well, my job on the first was, as I say, was Air Force representative during the activation of the complex. When Colonel Albert asked me to stay there, I was Chief of Facility Engineering. Now, that job was I was responsible for all the facility of Complex 19. The operations side of the house had the vehicle and I had all the facility. That meant that I had to make sure that everything was ready to go, was kept in operating conditions, and procedures were developed before we got ready to launch and that we could certify that the facilities were ready to support the launch.

The job was working with—I had RCA [Radio Corporation of America] and Pan Am [Pan American] at that time, or the contractors arranged, so you had to develop procedures and understanding with those people that they had a part to play in the program. Up until that time, Pan Am was more or less independent. I mean, they kind of went [the way] they wanted to. We had to bring them into the team, since they had never worked under this type of concept. We had to change their concept of thinking, so that was part of my job is to see that all the communications and all the maintenance on the facilities was under my direction. I also had the direction and supervision of the press.

As you know, in the Gemini Program it was decided that rather than have each of the major networks to have their own crews, CBS [Inc.] had developed a portable what we called portable camera, TV camera, which a man carried on his shoulder, and the crew did points of interest that was necessary for the press. So it was decided that it would be cheaper to have one crew do all the camera work and then the other crews would work from that. So CBS had that responsibility and they did a tremendous job. At first some of the major networks were a little unhappy, but later on they found out it was the cheapest thing because they did not have to buy cameras, they did not have to hire people, and CBS had already been trained and they worked under their supervision, so it turned out to be cheap. So I had to worry about the press, as well, so that's that. That was a job, and I had five people working under me directly to keep that going.

WRIGHT: Were you able to choose the members of your staff or were they assigned to you by NASA out of the Air Force?

BARTON: No, I was able to pick up three of the men I wanted, and they had worked for me on Complex 11 and I knew their capabilities. So I went to Colonel Albert and told him that we needed these people. He brought them over. So it made it easier for me, it made it easier for the program, because these people worked on Atlas and they were familiar with weapons systems. This was no more than taking a weapons system and developing it into a space vehicle, so it made it easy. We all could comprehend and understand terminology and work together.

Of course, we worked generally two shifts until it came to launch. So I split up my crew into two shifts and that way we could support the operations.

WRIGHT: I guess those early days were long days for you.

BARTON: As Colonel Albert often said, he said, "I've never come out to the pad anytime that you weren't there." So it must have been long. Yes, particularly when they were doing tests, I didn't feel comfortable walking off and leaving my crew there, not that they weren't capable. I felt that I needed to be there in case we did have a problem... I'd make certain that the problem was being handled properly. Even though I trusted them and they knew that. But I had the responsibility of reporting to Colonel Albert, I had the responsibility of reporting to a couple other people, and so it made it easier that it didn't put my people in an embarrassing situation. In dealing with higher ranks, sometimes you could have a problem. In that program it didn't, but I never wanted to put them in that position.

Eighteen hours was usually a normal day. We'd get in about ten days before launch. We went into what we called full operational mode. A lot of time I slept on the desk in the ready room to make sure we were all aboard. And I had to keep Colonel Albert posted on status all the time.

WRIGHT: You also had a rank still then as Air Force personnel, as well as being the Chief of Engineering Facilities?

BARTON: Chief warrant officer W-4, that was my rank. Of course, there were very few chief warrant officers in the Air Force at that time. It was, I guess, because of personality and that, but never had anybody questioned it. With Colonel Albert, you dare not to question one of his people, so he was the only that did the questioning, so I never put my job in any position where I felt that it would be questioned.

In fact, there was the point where Gus Grissom and Wally [Walter M.] Schirra [Jr.] and Tom [Thomas P.] Stafford and them would come directly to me to talk about problems rather than to go to some of the areas, because I guess they felt comfortable. They knew they'd get the

straight answers. If they had a question anytime, particularly Gus, they would come and talk to me about things.

WRIGHT: That certainly was a boost to the confidence, but also bad to the responsibility that you had to work with them so closely that they felt so confident in you. Maybe some of that came from the fact that you had been there during those Atlas days and had helped get those rockets launched. Would you like to share some of that information about what it was like being there during that time, to see of those first rockets go, and then, of course, some of them not go, as well?

BARTON: Naturally, anytime that you failure, it's a disappointment to you. I mean, I was in the Atlas Program and it was always a thrill to see it go. It was always a thrill to hear down range [calling] back to you that everything was working properly. I think a disappointment was whenever you had a failure you'd always begin to wonder, well, what failed and who failed and how it had failed. In those early days, we didn't have all the data you have today, so we had to more or less take certain information and then redevelop it to find out what happened. We had one vehicle raised up eight feet and failed, and it came right back into the flame bucket. Of course, it didn't do what I'd say was a complete major destruction of the pad, but enough that we had to rebuild the pad before we could launch another vehicle.

Understand that Complex 11 was what we called the test bed for the weapons systems. We'd fire the missile [down] range and then West Coast, Vandenberg, wouldn't launch until after we'd fired, to make sure that the vehicle was a success. So it had a dual mission, and at the same time we had pressure put on us that we should be successful, because it was developing the weapons system which would defend our nation. I think it put more pressure on us than it did the West Coast, because we were flying the vehicles from the standpoint..., it was [direct] out of the factory and we were the first ones to put it out on range after that.

So it was fun, challenging, but at the same time I learned a lot. I learned a lot how to handle myself, as well as handle the people, and encourage the younger people that they were in a position that the future of our country depended upon how they reacted to things.

WRIGHT: When you were working on the rocket project, did you have any idea where that project was going to lead you? Did they have talk during that time of moving up to the Moon?

BARTON: It wasn't until we got into what we called the E Program, that we began to hear about NASA, and, of course, President [John F.] Kennedy said they wanted to put a man on the Moon. At that time in the planning stage, and, of course, when he said that, he's Commander in Chief, and to me, as a military man, he's my boss. We all felt that way, but when we heard that, I guess, it put a lot of questions in your mind. How you going to do this? What are you going to do it with?

When it was decided that they'd use the Atlas to put Mercury astronauts into space, I guess it was a kind of feather in our hat. We felt proud that this vehicle had been selected and we knew its capability and we knew that if there a vehicle that could do it, that Atlas could push them into space. There wasn't any doubt in our mind, even though some things that the vehicle had to do, they had to change some characteristics of the vehicle. But there was never a doubt in my mind that we couldn't do it, particularly after I saw Alan [B. Shepard Jr.] and Gus go into suborbital flight. I knew if we could do it with a Redstone, they could certainly could do it with an Atlas.

At that time we weren't talking too much about what was going to happen. The Moon, there was a lot of rumors in the press and everybody about getting to the Moon, but I think a lot of people were speculating. We felt, particularly in the Gemini, we had to take it step by step. You have to take each step and develop it and make sure that you're developing, that your criterias are all met to go to the next.

For example, in the Atlas Program we flew the computers and a lot of equipment that went into the Gemini just to prove them, what we called the Pod Program, put the computer in a pod, hang it on the side of the Atlas and then we'd get up a certain altitude you'd have the thing come off and the computer data would be developed. We flew most of the computers and some of the rate gyros ... on the Atlas, so that there was some experience, we knew when they put it on the Gemini Program that they were going to work. I think that was a learning step that was the way to go, don't just run out and start throwing things into space, because you're going to have failures.

WRIGHT: Had your relationship with Gus Grissom and several of the other Mercury astronauts start back during those times, or did you get to know them more and more as you worked on the Gemini Program?

BARTON: No, my relationship started with Gus and the astronauts, Mercury astronauts, Gus and Wally Schirra, Alan Shepard, [Donald K. "Deke"] Slayton and Dick [Richard F.] Gordon [Jr.] and Tom Stafford, was in the early days of the Gemini. I think how I got really close to Gus was that Gus, being an Air Force gentleman, was probably one of the most down-to-earth men I'd ever want to associate with. Gus found out that I was having certain responsibilities in the facilities and he would come and talk to me about things.

Wally Schirra was Navy, a fine gentleman, but you take Tom Stafford, Wally Schirra, and [Charles C. "Pete"] Conrad, Dick Gordon, John [W.] Young, those seemed to be a nuclei that hung together. You take [Frank] Borman and some of those, they were the second class, they kind of hung together. So you always had that relationship of the two basic relationships, and I think I was more a tendency to be closer to the first group, because they, to me, were the men that really had stepped out to volunteer their services, Al Shepard, Gus Grissom, suborbital flight. Nobody ever, other than a monkey or Ham as we called him, had been put up in space,

but here's two men that were selected, volunteered, and were readily accepted to do what their possibilities were. I probably was closer to them because of that. Alan was a fine gentleman.

Of course, please understand that the day Gus got killed in the [Apollo 1] fire, I had had lunch with he and his father that day, and it was really something that struck, really hit me hard, because probably one of the few last people that saw Gus alive, particularly his father being there. I was close with Gus and Wally and Tom Stafford, because they were a jolly type. I mean, they never seemed to feel that they were down. I never saw either of them that they felt like, or they looked like they were worried about something or were down in the dumps. That made your life easier, because you knew that they weren't disgruntled about something.

WRIGHT: What a thrill it must have been for you to see them launch.

BARTON: Oh, yes. I was always at the pad to greet them when they came over from 16, and he was over in the suit, we had our signs. If I had felt at anytime that there was something that was going to deter that flight, I'd been the first to volunteered to tell them. I would never have wanted to see something happen to them.

It's like when we had GT-6 [Gemini-Titan], when it shut down prematurely, Stafford and Wally Schirra, they was glad to see that everything that had been designed and all the procedures we had developed worked. Even though the vehicle shut down, we had a fire in the flame bucket, we were able to get the crew out successfully, and it was always a great joy to see that, you know, to know that what we'd done, what we'd developed in procedures, worked to save that crew.

WRIGHT: Absolutely. Of course, Gemini, you've mentioned it earlier, you've called it the—it was on the cutting edge, that it was a new way to develop a whole part of the space program to

get us to the Moon. Share with us those times. Share your thoughts about how, why was it so important to do Gemini and what you learned from being part of that program.

BARTON: I think Gemini picked up from the basic knowledge we learned from the Mercury, basic that man could survive in space. We knew that Schirra and [John H.] Glenn [Jr.] and them had gone into space and we found out that they could survive. We also found out we could recover them successfully. So there was your first three basic steps. You put the man up and you brought him back safely.

Now, Gemini, as I said, was on the cutting edge, as far as I'm concerned, of the space from the standpoint that we're taking this program now and we're going to see what we can do to prove to the engineering people, the design people, that man could go out there in space and develop certain procedures and you could do certain things with him, like walk in space, work in space, and then bring him back.

At the same time we used Gemini to develop part of the Apollo equipment. We were able to use the vehicle number 12, and as I said, we put 11 up there and it's set at a certain height, a certain orbit, and we put 12 up there, and they were to find each other without the aid of any ground communications with the radar, was to basically prove the theory that you could go around the Moon and come back to a known object. Basically, as I say, that put us on the cutting edge of space. We were right at the edge, we knew we could do it, now where do we go from here? That, of course, was the Moon.

We found out man could work in space in a spacesuit. We found that we had some problems, that man could maneuver in space with his backpack, and we had some problems with that, but we were able to understand what caused them and overcome those. Each time that we launched a vehicle, the objectives of that vehicle were met. But at the same time, it taught us here what we had to do to either improve or to go further out into space. As you know, the spacesuits today, in the earlier days, spacesuits weren't as nice as they are today.

We had problems a couple of times when they were working in space. One of the tools didn't work right from the standpoint that nobody figured that being in space that when they tried one of the tools, instead of the tool working, the astronaut spun. So it's just then how do you develop procedures, how do you overcome these things.

So I'm saying it's on the cutting edge of space from the standpoint we were learning and we were trying things, and the things that we were doing on the Gemini were later developed for the Apollo, and even some of them are used in the programs today. That's why I said it was on the cutting edge. Nobody knew. You didn't have anything in the books to tell you what was going to happen. You had probability factors, but to say, "This will occur," we did not have that.

It's like in the Gemini when Dick Gordon, they were going around the Moon, they noticed the temperature was tremendously different. It got much, much, much colder. In fact, when Dick first went around, his spacesuit fogged up on him, so we learned that, see. So he went from the light side, or the hot side of the Moon to the dark side, so even though there was a short duration, we had suit problems. So that had to be overcome. So that's why I'm saying it's on the cutting edge.

WRIGHT: Could you walk us through if there was such a thing as a typical day during a launch? As you said, the days right before the launch, how you were preparing, what were your responsibilities to do, and then what you were doing while they were in orbit and then back again.

BARTON: Launch preparation start about seven days before launch, actually. Now, you did it by systems. I mean, certain systems you had to make sure that they were ready to go, checked out. Then seventy-two hours before launch, things really started to work, you had to load fuel on your launch vehicle, you had a lot of other work that had to be done at the last minute, such as making sure the engines were all ready to go and all your systems were ready. At that time, all your

facilities were checked out to support the launch. Your water systems and your escape systems and all, have them verified.

That typical day on launch day would be, we ran two crews, two what we called launch crews. We had Crew A and Crew B. Crew B, let's say they're going to be the launch crew, Crew A would do all the preparations that night, loading fuel, topping off the fuel, making sure that everything was checked again and double-checked. So that crew would come on like today and they'd work through the day.

Then if we're going to launch, say, at ten o'clock, the next crew came on at six o'clock in the morning, took over. From that time on, it was system by system, everybody verifying their systems on a vehicle and the facilities. We verified all the systems on the facility, the water support systems, the escape systems, emergency systems, and everything was verified.

In my case, it was up to me to see that all these were verified or operational, and then you report that status to the test conductor and then, in turn, report it to Colonel Albert that the systems were ready to support the launch.

During the launch, you more or less just monitored things. Now, we had seven TV cameras on the pads for critical launch, in case something happened. You could view it from blockhouse, and you had to keep them in status at all time.

For example, on vehicle number VIII, somebody ran over a cable, a TV cable, right about [thirty or forty] minutes before launch, so all the cameras went out, but nobody knew what had caused it. I had happened to see the man run over the cables, and I walked over, and without saying anything to anybody, knowing that that mission would be aborted if we did not have the cameras, so I got down on my knees with my pocketknife and peeled the cable back. One of my men that worked for me, we spliced the cables back. Camera would come on one at a time. Everyone out here said, "Well, there's a camera on. There's another one on." So that was the type of mission we had to do, and I felt at the time not to say anything, get the thing done, because it would have stopped the operation. That's just an example of how you work.

As I told you, the TV crew I had to watch over and see that they got the necessary view, because they were feeding the information into New York, and New York was passing it on to the world, you see. Generally, with CBS, Walter Cronkite was the main man with that. So you had to keep them in control and not just let them run everywhere. So it kept you busy.

On the vehicle side, all your systems people had to verify the systems. You ran your system, every fifteen minutes you verified your system to make sure that you didn't have a problem. They reported that status to their test conductor, who, in turn, reported to Colonel Albert. ... Colonel Albert was the man that had to say go or no go. If there was any problem, he had to make a decision whether he wanted that vehicle go, or go into a hold. Great responsibility, because if it had been a mistake made, it would be his neck. I mean, it wasn't Martin Marietta; it would be Colonel Albert.

So up till the launch, thirty minutes before launch, you cleared the pad. Everybody went back to the blockhouse and was put into the blockhouse and we secured the blockhouse. Blast doors were all closed so that nobody outside. You stayed there until after launch. After launch, the first thing we did, we made what we called a pad assessment, damage assessment, and that was done by your crews ... and then I took over and went to the pad and started cleaning up the pad, getting ready to put the next vehicle on the test stand.

My day, I'd be there at two in the morning and I'd leave probably midnight that night after I got the schedules all laid out for the refurbish of the pads so the next vehicle could come out on schedule. Our schedules were tight, so if you had any delays, you had to figure out how to work around them. If one thing didn't work, why, you had to be able to shuffle something else into that schedule and make sure it was accessible.

For example, on GT-6, when it shut down, a great decision had to be made because it changed the whole concepts, so we decided to take VI off of the test stand and put [Gemini] VII up and run VII mission. Well, that's a tremendous task to take one vehicle down. So what are we going to do? We take it down and we put it on what we call security. We put it in the

hangar, put guards on it. Nobody could go on that vehicle unless they were escorted. So that schedule was very tight.

Vice President [Hubert H.] Humphrey was there at the time, and Colonel Albert got his people together and came up with a schedule and presented it to Colonel Albert and Mr. [James A.] Webb, who at that time was head of NASA [Headquarters, Washington, DC], to put VII up and then launch VII and then find out what the problem was on—then put VI up, solve the problem on VI, put it up and make it go.

Colonel Albert presented the schedule, and I can remember he was asked, Dr. [Robert C.] Seamans [Jr.] at that time was head of the Air Force, he said, "Are you sure of this schedule?"

He said, "Yes, we'll make it."

So that's the certainty that people had and the trust they had, so as you well know the history. We made the schedules, VII was launched and VI was put back up and it was launched. It would be hard, I think, today to get people to understand that.

WRIGHT: It was an atmosphere of whatever needed to be done got done, so that you could continue.

BARTON: The atmosphere and philosophy was "It will be done." That started right with Colonel Albert. His philosophy was, if you're not sure, then don't commit yourself. We finally got that bred into the minds of the contractor. Sometimes the contractor, "Whoop, whoop, we can't do that. Can't do that. Can't do that." Why can't we do it?

I had Pan Am one day tell me they couldn't do certain things after launch, and I said, "Why can't we?" Well, they didn't have an answer. I said, "Well, we can do it, then. Unless you can tell me why it can't be done, we're going to make a try, if we find out we fail, then we know what failed and we can correct that."

So the attitude was, it's going to be a success. I don't think that I ever heard anybody say we couldn't do it. I don't think that even Martin Marietta got to the point where their philosophy was, "We can do it." For example, when VI had the problem, first thing was, "We can't turn it around." Well, why can't we turn it around? We know where the problem's [are]. You know it's on the propellant side of the house. So long story short, they found out that somebody in Baltimore [Maryland] had left a dust cap in one of the ports in the oxidizer valve.

Now, if we'd just taken the philosophy you can't do this at a certain time, I think that George [E.] Smith at that time was head of Martin Marietta out of Baltimore, and God bless him, George's attitude was the same thing. Because it was a feather in their hat to do these things, even though it hadn't been done in development of weapons, but we're in a different phase of the world and his philosophy was, "We'll give it a try." So I think that helped everybody, too. No, I never heard anybody with a negative philosophy. I think after vehicle number III, it changed a lot of things.

WRIGHT: There were a lot of changes in Gemini because of the phases that it went through from the development to the long duration, and, of course, the rendezvous and docking. It was a tight schedule because so many flights were done, I think estimated one every two months. So your job never stopped, did it?

BARTON: No.

WRIGHT: You just continued having to make enhancements and improvements?

BARTON: Yes. Anything you could see where you could improve things, they expected that. Colonel Albert expected you to do it. For example, on the damage from liftoff there were certain sections on the tower that always got damaged, so I went to the contractor and I said, "Now, we

know this section gets damaged every time, so I want you to prefab all the panels for each side and have them in stock, so when we launch the vehicle, all you have to do is go pick up these prefabricated panels and bring them. You don't have to go out there and measure and cut them, because you've already got them." Now it's a matter of just putting them together and cut about two days out of the program, just things like that. You're always trying to figure out how to improve things.

I think that again came from a standpoint that we realized that we had a tight schedule, realized that we did had to be done perfectly or proved to be the right way to do it. There was no second-guessing. You do it the right way the first time and you would be successful. I think that was one of the mottos that Colonel Albert had. You do it right, it'll work right.

WRIGHT: Did you have one mission that you feel was more challenging than the others?

BARTON: Well, I think [Gemini] VI and VII were the real challenges. After we had the failure, we had then to come to face reality. I mean, here we got two vehicles and here we got to have VII basically flowing, and we had to be back on the ground before Christmas, because the range was going to close down at Christmas holidays. So here you are sitting in November, you've got two vehicles that have to be gone. So I think if any one of us, a real challenge was VI and VII, I think that's why we nicknamed them Project 76, which is back in the early days of history. If you look back to say that you have to have the [Gemini VII] crew back, that was Borman and [James A.] Lovell [Jr.], we had to have them on the ground before Christmas because of the range. It was a real challenge, I mean, to get them up there and get them back.

I think the rest, each vehicle had its own challenges. I mean, I never took that any vehicle was routine. Each vehicle, it was a challenge to all of us to make sure. I've learned over the years of working in operations and engineering, that no two vehicles ever respond the same. Either you have some little problems on checkout that you didn't have on the other one, or you

have some operational problem. So I never got complacent with the idea that, "Hey, this is a snap. We've got the procedures." Each vehicle had its own peculiarities and you had to learn those things and you had to cope with them.

Even on the facilities I'd find one launch that would have this that might occur that had to be addressed, the next time it wouldn't even occur. I mean, damage was different sometimes. A lot of it depended upon that vehicle itself, the thrust that generated the liftoff, the direction of wind caused the heat and the flame pattern to go a different direction. So you just couldn't say, "It's going to go this way." I even learned that in the Atlas, that we couldn't rely on every vehicle being alike.

Procedure-wise, yes, you proved with the procedure, you proved that that system would work, but then you had that characteristic change. For example, you've got to understand in the Atlas, that vehicle was using liquid oxygen. Of course, liquid oxygen is cold, all your facilities in your vehicle structure would change because of that cold temperature. So you always had to be on the lookout for some anomaly that would normally not happen. So it took the ingenuity of the people to know their vehicle, know their system, and know the capability of what they and their people could do to make it successful.

WRIGHT: Communication was certainly essential. How did you ensure that people knew what was going on?

BARTON: We briefed every system. The system engineer had a briefing with his people, so you talked about, during that system if somebody saw something that maybe it wasn't what we call up to par, you'd discuss it. The communication was that each time that you ran a system, you had what we called a system critique. People were asked to volunteer if you saw something that you thought was unusual. To you it might be ridiculous, but some people would say, "Well, I don't want to talk about it." Well, let's talk about it. That's the way you learn and that's the way

you communicate with people, and that's the way that they themselves can comprehend the system, and then if it came up again, they would know how to react to it.

Communications, I might as well tell you, today is our largest problem. If we would get people to communicate, we wouldn't have wars and struggles and these things in this world today. So the communication in those days was of more paramount importance, because you were dealing among yourselves and you were dealing with something that was comprehended and comprehensive in its structure. Man designed something, so now can you work with it and communicate with yourself and other people and with the system and make it successful.

BARTON: For example, on the Atlas, the Atlas vehicle, a lot of people don't understand, stainless steel is only 32-thousandths inches thick, the skin now. Now, can you imagine taking something like that and putting propellant in? It sat there alone on the pad. People, you tell them that, and they look at you like you're crazy. Remember, now, we'll put an astronaut on top of the Atlas. Why, you set that glass there 32-thousandths inches thick, I mean, that—so, yes, communication was tremendous. I think this may be a problem that we've had in some of our future programs, there hasn't been a close enough communications that people understood.

WRIGHT: How do you feel the goal that President Kennedy set so early in the program helped define people's value of communication? Do you believe that this common thread of them all working together to make this happen helped them share more information?

BARTON: Well, first I think because of him, the leader of the country, that he had challenged the American people, he said, "We're going to put a man on the Moon and return him safely," now, that, from the leader of a country, we're a lot different in this country than in Russia and the other countries, where the leaders speak, you're not sure whether it's meaningful or not, but can the people accept it. The American people accepted Kennedy's challenge that we had to put a man

on the Moon, and I think his challenge to the people that was going to do this was, "Hey, this is a job that we've got to do, and I'm going to expect each of you to do your part to make sure that we put man on the Moon and we bring him back successfully."

I know myself it inspired me that we have to do this job and it has to be done in such a manner that we don't embarrass our country, we don't embarrass ourselves. I think embarrassment just would have destroyed the United States. If we'd had a real catastrophe with that, I think it would have really destroyed the integrity of the United States having a desire in the future.

WRIGHT: Did you feel we were in a race with the Russians?

BARTON: I never felt that. I never felt that. The only time I ever felt it was a race was in the weapons systems. I felt that in the weapons systems, we had to get a weapon that was operational, a weapon that we could put out there that would defend our nation, and we had to be first, because you never knew, or I didn't have a feeling that you could trust Russia. That was proven in the Cuban [missile] crisis, that we couldn't trust them. So I never felt a race in the space program at that point. I'm sure there was a lot of other people that did, but I never felt it was necessarily a race. I felt if we did our job, and did it properly, and did it totally with the philosophy that it was going to be successful, we would make it. But have no fear, as I'd say. If you start having fear in something, you're going to have problems.

WRIGHT: Erasing that fear for those astronauts was, as you mentioned, a lot of your responsibility. You had to make sure that everything was in place. But when you arrived at Cape Canaveral, [Florida] there wasn't much there, was there? Was it pretty barren land at that time?

BARTON: Well, when I arrived at the Cape, as we used to say, about all we have is rattlesnakes and scrub brush. There had been some minor operations that went on there, but when I got there, and the Atlas D Program had just been in effect, and Titan I was being developed. So the area was an isolated area, I mean, you could stand to one side and not see too far because of all the scrub brush and all that. One little road to go to, to get to the pads and that.

Then Polaris arrived, which added a scene to it, and then Minuteman arrived, when had another scenario to it. Then Titan II started arriving, and so I watched it grow. Then, of course, the Atlas Centaur arrived, it was right next door to us. So you'd see these things, you'd see, here's a little Atlas, here's a great big old Centaur. Then we started seeing the NASA side of the house start building up and then you could see a change.

WRIGHT: How did that affect what you were doing? Did you have to communicate with these other areas, as well, to let them know what you were doing, or were you pretty much isolated?

BARTON: Well, each pad basically was isolated from the standpoint as far as communication. The only people we had to communicate was with the range, range operation, who totally arranged that. Of course, you understand a lot of stuff at that time was classified, so you had to be careful what went on and not reveal any of the things that we had on the Atlas. As I said, we were flying some different warheads at that time, which were highly classified. We never confessed that we were flying any nuclear stuff, but we did fly some small nuclear detection systems and that.

So you didn't basically have a close communication with the other facilities, so you more or less were put into what we say, you were put in your own pad and you stayed there. Not like a prison, but you didn't go venturing up and down the road.

WRIGHT: The transition from your time at the Atlas to your days in Gemini, was it more or a seamless transition, or did you have to train someone to do your job that you were doing there?

BARTON: No, the Atlas Program pretty much was phasing down. All I did was told to report to Colonel Albert and he told me to report to pad 19 and go to work. So I mean, my transition—you've got to understand that most of your facility structures and vehicle structures, the systems are of similar nature on it. All you've got to do is bring yourself up to speed to that type of system and that makes it—I think your basic experience, if the average person would really learn when you first hit the field, you could transition from one to the other. Just like when I went from Gemini over to work on the Apollo Program, I didn't find too much difficulty. I understood the mechanics of the systems and that.

WRIGHT: Now, I understand that one of the titles that you carried was that you were mayor of pad 19. Is that true?

BARTON: Colonel Albert hung that title on me, because he said everything—he says, "You're just like the mayor. You have to make sure that everybody is together and everybody's working in unity and that." So everybody hung a pad 19 mayor, and it got that way in the news. Walter Cronkite, he used to always check on the mayor of pad 19. Walter was a gentleman that wanted to have stuff that pretty much straight stuff. Walter Cronkite probably never, as far as I know, never reported anything that wasn't basically true. Some of the people at the Cape, press people, were always reporting things that weren't totally true.

I think if you understand that this is what got a lot of people in trouble with Gus. People, newspeople, made up stuff about Gus and his suborbital flight that caused him to have a tremendous, tremendous, ill feeling toward newspeople, because they said some things that were not true. It got in the paper and the press and that, so we tried precluding not to have any such

things like that. So working with the newspeople, I always made sure that what was given to them was fair, was square. Colonel Albert used to say, "Well, you're the mayor. You want to do this, you do it."

I had a relationship even with the spacecraft people, very close relationship with them. So I guess, basically like Colonel Albert says, "You're the mayor of pad 19." It's just like a mayor of a little city, so that's how I got that title.

WRIGHT: How many people were in your city? How many people were you working with, maybe not directly, but very much associated with pad 19?

BARTON: Well, we had about 500 people, counting our range people and all that. So it was quite a few people for that little vehicle, you know.

WRIGHT: In keeping with the analogy of mayor, a lot of times they will plan out improvements for their city, and we understand, also, that you cut a road for the astronauts and very well named, I understand, Barton Free-Way, by the astronauts. Is there a story behind that you'd like to share with us on how all that came about?

BARTON: Well, I guess it's time we share the story. As I mentioned to you, the road came about because of Gus. As I told you, Gus did not like the press, and he knew that the way that things were set up that he'd have to come out of 16 and go out, get on ICBM Road, go down and then come back into 19. He knew once he got outside of the fence that he was subjected to the press.

He had asked several times if they could shorten the distance between the two pads and, secondarily, he had a good point. Being in the suit with all this instrumentation, the longer you're in there, the more discomfort it could be, because they had to carry their air-conditioning

unit with them. Of course, when we got them in the white room, we transferred them over to the system and made them more comfortable.

They had put in a request to build this road, and people at NASA had turned it down and said that it cost too much money, and they didn't think they needed it and all that. So Gus one day said to me, he said, "Chief, is there any way we can get a road built?"

I said, "Well, Gus, right now it's [no]—but let's just put it on the burner and let it cook a while and see what happens," because I had heard that they were going to approve monies to clear the abort area. The abort area on 19 was that if you'll notice on the Gemini, we did not have the escape tower on the vehicle. On Mercury, you had the escape tower and all that, and on the suborbital flight, in case there was a problem, they'd fire these rockets and it'd take the spacecraft away from the vehicle.

So we had what we called rocket sled. In other words, the seats that the astronauts sat in had two rockets, one on each side, each seat, and a little sled track that the seat was on. If there was a problem, they'd fire that and it'd shoot. The first thing it would do, the doors would come off. That would sled then, the rockets would fire them up into the air, back behind the vehicle up in the air several hundred feet. Then the parachute would open and then they would land again.

Now, to the degree of how successful it'd be, we weren't too sure, because there were some marginal things that we knew about. But anyway, we [could not] have anything higher than three feet of them coming down. They could hit the thing or injure themselves. We wanted this abort area cleared out. Then secondarily, we needed it cleared in case we did have a catastrophe, we could move emergency equipment around, get it around the vehicle and around the area.

So the project was approved to clear out this abort area. Then we had to clear the area out between 19 complex and 16 complex. This was all the massive weeds, shrub. So when I got orders to clean the area out, why I thought, well, if we work things right, we might be able to build a road. I didn't talk to anybody about it, nothing of that. We had to relocate several fences.

The first thing to do is just keep pad 19 secure. We had to run a fence from 19 over to 16, we had to take the fence down between 19 and 16. So the fence was a part of the structure that would be in our way. So we had to do this. At the same time we had to operate 19. We had a vehicle on the test stand.

I got the orders, I went out one day and looked at the area and walked around and I decided, well, I'll make a decision. I got with the contractor, I said, "Every vehicle that comes in that area has got to come in from 16. You've got to follow this fence down there, just stay six foot from the fence, you follow the fence down, come down to here and then you go down here and start clearing this area. We'll push everything into the center and every vehicle that goes out of here has to follow the same route." Told them what to do, this is the way it had to be, and if I caught anybody not doing that, then we'd have to take action.

So the contractor understood. I said, "I don't want you to vary from it. If you've got a load sitting right inside the gate over there, you have to come down this route here." So they did that, and by the time we got done, we had a real nice roadbed made.

The other thing was, in clearing the area, we found several craters out there. You know the history of the Cape was that the Navy used it for a bombing range. Now, where the targets were, I don't know, but we did find parts of old practice bombs and that. We had several craters that had to be filled up, because that area had to be level, so that any vehicle went out there could traverse back and forth. So I found a big crater out there, and it had a lot of gravel and sand in it, so we dug up some of that to put on this roadbed.

Anyway, we'd taken all the stuff and moved the stuff into the center where we started [Pad] 19, and moved away, because we didn't want to interfere with 19 operation. So when they got through the roadbed was there, and I talked to the contractor and I asked him if he could put some oil on top of that, I said, just to keep the dust down. So I went out there a couple days later, and there he'd put blacktop on it...

So saw Gus, and I told him I wanted him to take a ride, I said, "We're going to check the time from here," I told him we were going to go down the road over to 16, see how quick we could make it. So I went down, drove him down the road and up [ICBM] and back into 16, and opened up the gate and we drove back on the road. You never saw a man—he was just like a new person. [When] he got over to the pad, and he said, "Man, I don't know, but it's there. I appreciate it. You don't know how happy you've made me."

I said, "Well, it's for you, Gus, you and your crews."

Then he went and got Wally and John Young and Stafford and all them, and we had a staff car we kept at the complex all the time. So he came and wanted to know if he could borrow the staff car, and I said yes. Didn't ask him where he was going, didn't need to know. He's taken it up and driving them on the road back and forth, all of them. So that's how it got [constructed].

Then the word goes—I wasn't there that night—but one night Wally, Tom Stafford, and Gus Grissom put the sign up. To show you how engrossed you get in your work, I must have walked by that thing a dozen times that morning, the first morning. I walked into the blockhouse, Al Shepard came to me and he says, "You know, chief, we can't launch today."

I said, "What do you mean [we] can't launch?" I said, "I haven't heard of any problem."

He says, "No, we can't launch." He says, "I'm going over and tell Colonel Albert." He was the liaison for the astronauts. He said, "I'm going to tell Colonel Albert that we can't launch."

I said, "Now, come on, Alan, get off my back."

"No," he said, "we're in violation of the flight rules."

I said, "You got to be crazy, man."

So he pointed the camera, and they had the TV camera on the sign and I was completely shocked. I had been by that dozens of time that morning. So I didn't say anything, I went and told Sergeant Eberle, who worked for me, I said, "Go down and pull that sign down."

He went down there and came back, he said, "Boss, we can't get that out of the ground." He says, "It's in concrete."

So I said nothing. I didn't even go and tell Colonel Albert. So after launch, [when] Colonel Albert come by, and he says, "You know, we violated the flight rules today."

I said, "Yes." I said, "Well, sir, we tried. We tried to get that sign down and it wouldn't come down. They've got it in concrete."

He says, "Don't worry about it." He says, "I think it's marvelous," and that's all that was ever said. That's how the road got there, constructed, and Gus and them put the signs up.

WRIGHT: Now, were these makeshift signs that they made themselves or that they had to order?

BARTON: No, no, no. They apparently had gone someplace. The post they put in the ground was one of these steel posts that the highway department used to put up signs. The sign was made with dark green with the black letters, just like—I don't know. I never could get Gus to tell me where they had them made. They had it made. In fact, they had [three] of them made and put up. We have the original, I have—well, I don't have it. I've donated it.

The daughters and I got together and we decided to donate it to the Air Force Museum out there, so it's back in the hands of the museum. Colonel Horn told me that they're going to have new signs made and put up. They're going to rebuild the highway, or the road, and they're going to put up signs. So the daughters and I felt that for historical reasons and dedication from us, we would donate it back to the Air Force Museum at the Cape. So that's where it's at. Saw it this past week we went down there. They wanted me to autograph the sign so they brought it and I autographed it.

Colonel Albert, who, of course, I keep calling him colonel, but he retired as a lieutenant general. He signed it. Tom Stafford signed it. They were going to try to get other astronauts to sign it when they came by, if they visited the Cape. So it's going to be a part of history.

WRIGHT: It's a very well-appreciated road.

BARTON: Yes. I'm happy to do it from the standpoint that in my own heart I felt it should have been approved the way when it was asked, because I know I'd feel if I was in that suit and had to travel four or five minutes further than normally could traverse, why, it'd make them more comfortable.

I think one of the objectives that we all had was that we had to put ourselves in their position and do what we could to make them comfortable, because they're going to the unknown. We're down here, and they're the ones that's having to do the research out there in space for us. Anything that we could do or should do to make their life more enjoyable and easier, it was an obligation for the Americans to do it.

WRIGHT: I'm sure you displaced a few rattlesnakes while you were building that road.
[Laughter]

The Cape certainly has changed through these years, and before we spend some more time talking with you about how your work moved into the Apollo age, let's take a break for a second and then we'll come back and go from there.

BARTON: All right. [Tape recorder turned off.]

WRIGHT: Well, we have certainly enjoyed hearing about those days that you were with Gemini, and before we leave and visit a little bit more on other subjects, we probably need to know a little more about your Barton Free-Way signs. Describe to us, you mentioned it was green with black letters, and tell us what else it said, and also why was Alan Shepard almost insistent, laughingly, that day that you couldn't fly.

BARTON: As I mentioned to you, flight rules are rules that you establish before a flight, is that you don't basically violate these rules, and I guess a lot of people didn't know Alan. Alan probably was, I'm sure you've seen pictures of Alan, Alan was a serious type. I mean, you had to know Alan to appreciate his sense of humor. Alan and I got to be very close, and anytime he could find something he could rib me about, why, it was a plus for him.

He happened that day to be what we called the astronaut boss that day, and they're there to see that everything is done according to the books and that. I think he was trying to feel me out that day to see if I was doing my job, which he found out I wasn't. But it was at a very, very jokingly manner and a manner of respect for each other.

The sign was made out of aluminum and it's about two foot long. It started out with Barton, B-A-R-T-O-N, in capital letters, dash, Free, F-R-E-E, dash, Way. It was put on a dark green background with black letters. I think that they must have had somebody in the highway department, because it was made out of the same color your street signs and that are today. The way it was laid out, why, it was very attractive. Of course, it faded over a period of time. We got it, and I think it's just a self-respect. I mean, they done essentially that, in my opinion, that they really appreciated that that was there. That was one way of them showing their appreciation to me for having the road built. As I say, it's going to be in the museum at the Air Force down there.

WRIGHT: Then why again did Alan Shepard say that because of that sign it violated the flight rules?

BARTON: Our flight rules was that anything higher than three feet could not exist in the abort area. We were afraid if astronauts coming down, they would hit it and injure them or something. So we were always very particular about it. In fact, we had the area mowed at times to keep the

scrub brush down. Alan was pointing out to me that that was six foot and it violated the flight rules and we couldn't fly, we had to abort.

I later sensed that he was kidding, because I saw in his eye that he was kidding about the thing. Of course, as I told you, I sent one of the men that worked for me down to take it down before launch, and he come back and says it was in concrete.

As I said, anything would be a violation of any policy or rules during a launch, you adhered to it. So that particular day it was violated. I think if we'd taken it down, they'd probably, I look back now, they'd have probably, somebody would have been a little bit upset. So I'm glad that I made the decision, leave it alone. You pay particular attention to flight rules. What we did, as I said, some said you don't do this, you don't do it.

Afterwards, Alan laughed, put his arm around me, he says, "Well, I got one on you now," see, so I know it was a good gesture.

WRIGHT: Creating that abort area must have been quite a project in itself, because you mentioned it was just acres of undeveloped land.

BARTON: Well, the abort area was the size of a launch complex. Yes, it was quite extensive. Of course, you understand we had to have an area because if they fired that rocket sled out of there, or the seats out, happened to get caught in some wind, why, they could drift. Remember, they're only up there a short few hundred feet in the air, so the likelihood of having a wind wouldn't be too much, because we had a restriction on the winds anyway.

But we also had to use the abort area in case that we had a problem and had to get emergency vehicles in around the vehicle, we had an area we could move them in around. From our complex we had a lot of tanks and a lot of other fixtures around there that this abort area made it easier to get the fire equipment in if we had to and such as that.

So it was an important area, it just wasn't only an abort area, but it was also for emergency purposes so we could move our emergency equipment around and get to where we had to get. If for some reason or another we had a fire or something of that nature, we had room to move our vehicles.

See, if you get on a launch pad, you're restricted, you've got just a narrow area up there to work. So with the abort area where we could move our emergency equipment in, and we also had oxidizer tanks and fuel storage areas in the area, so we had to be able to get around them in case we had a fire catastrophe. So it was very important that we had this area level. We had the area where we could move equipment around, so we called that our abort area. It covered a size of a complex.

WRIGHT: During the time that it was being created, it had many types of large pieces of equipment, and were there episodes of where the astronauts decided to work some of those large pieces of equipment? I understand that there might have been some time that they were moving some of the rattlesnakes for you. Is that a true story, or is that something that—

BARTON: The Cape is a home of the rattlesnakes. I mean, we had found one got on 19, even before we took the fence down, and he measured eight foot. There was rabbits out in that area and armadillos and all these things.

Gus one night did target practice. He was going to get him a few rattlesnakes, so he got some. Something that he and Wally Schirra had a little contest going between them was who was going to get the most. You had to be careful with the firearms. You have to understand most of the work was done at night. The reason we did it at night because we had less traffic around the pad and that, and then I didn't want too many people knowing what we were basically doing, because they'd see this and then people would be asking questions about it.

So I had told Colonel Albert, the contractor has agreed to work the night, because it was his advantage, because he didn't have traffic to fool with, he could get his equipment in and out, haul the debris out without having all this traffic to fool with. And they were happy to work at night.

So Gus would go out there at times, he'd tell me he wanted to go out there. You could see rattlesnakes. We also didn't want them to get them on 19. So somebody had told me that if you put lime down they won't crawl through it. So we'd put a path there about twelve feet where we kept lime spread in there, trying to keep them off of 19, because, you know, they'll get in your equipment and everything else. Yes, we had some times with them.

Rabbits, there was a lot of rabbits. Of course, they didn't bother you. Armadillos, they were a nuisance at times. They'd get into some of the cable ways and that, but we seemed able to keep them down by working at night, moving everything to a center, kept the wild animals unhappy, kept them toward the center.

WRIGHT: How did the weather affect your responsibilities? I know you certainly couldn't control that element, but was that something that—

BARTON: Rain or shine we worked. In my entire experience at the Cape, the only time that we didn't work is if there was a hurricane in the area. But even if it rained, we worked, because our structure was enclosed. We kept it enclosed so that the crews could work on the vehicle, or they could work on the spacecraft. Of course, we wouldn't launch in the rain, but we didn't have that problem. We were fortunate in that aspect. But rain or shine, if you're scheduled, everybody worked.

We observed pretty much Sunday for the crews. I mean, everybody generally got Sunday off, unless we were getting ready to launch, major test. We tried to keep our overtime at an absolute minimum, because overtime costs you money. As far as I'm concerned, overtime is

wasteful, because, as I always tell people, you can't run a man one and a half times faster anyway, so you waste the money. So we tried to manage. Colonel Albert's philosophy was, just keep on schedule, not use overtime unless it was an absolute emergency. Like on GT-6 we used overtime, but normal vehicles, overtime was a no-no. So it saved the taxpayer money, and at the same time you didn't force your crews into fatigue and that stuff.

That's one of the problems I see with overtime is I always say, well, you can't run me one and a half times faster than that. Say, "Well, I'm paying you overtime, I'm paying you time and a half." Well, I can't run time and a half. [Laughter]

WRIGHT: You're already running at 200 percent.

BARTON: Right.

WRIGHT: Of all the responsibilities that you had during the Gemini time period, did you find that one task was more difficult to accomplish than the other?

BARTON: I think as far as tasks are concerned, my greatest concern and challenge was each liftoff, is how much damage you're going to have and how soon can we get that turned around where we can get the next vehicle along. As I said, no two vehicles react the same; the damage pattern is different each time. So my biggest challenge was every vehicle as far as blast damage was concerned.

WRIGHT: As Gemini progressed, and of course, most people knew, or everybody knew, that we would be moving toward the Apollo era and moving toward going to the Moon to fulfill John Kennedy's challenge. So you knew that your job would be changing. Did you know during Gemini where you would be going after the program had stopped?

BARTON: No. At that time, I was getting ready to retire and I kind of thought to myself, well, it's time that I relax and spent more time with [my family]—as I said, I had several offers to go with different contractors, people that I knew, developed a friendship with. So I was just going to retire and go play golf, and it didn't work out that way.

WRIGHT: What did you do?

BARTON: Friends of mine were working for a contractor on Apollo. Dow Chemical had the engineering contract for Apollo. A couple of friends of mine talked to me and said that they wanted me to go up there and work for them, they knew me and said that they needed some people and needed some help. So I finally discussed it with the family and decided to go back to work.

So I went to North American [Aviation, Inc.] and I wasn't satisfied with what they were going to do. A friend of mine, very good friend of mine, worked for NASA and he wanted me to come out there. I talked to him. I'm not cut out to work basic civil service. You're kind of restricted to what your thoughts and responsibilities can be sometimes.

I went up to Dow, and the gentleman hired me right on the spot and told me to go to work, take my physical and go to work the following Monday, so I went with them. They had the responsibility for the engineering on [Pad] 39 A and B. The altitude chamber for the spacecraft, I worked on that. When I first worked with them, I went to 34, doing project engineer on modifications and that for 34. Then I went over to 39 and worked on that before they were getting ready to launch the LM [lunar module].

When I got through there, then I went to 39B and worked on that, and then worked on, as I said, the simulator, altitude simulators. It had some problems. Our company was about to lose the contract, so they asked me to go on that project and I went over and got things organized and

we got back on schedule. So there were challenges. Of course, my problem is I'm conscientious about things. I mean, if I had a schedule, then we're going to adhere to it. So I worked for them until Apollo 13. I left. Dow transferred me to Freeport.

WRIGHT: That's how you moved to Texas?

BARTON: Well, yes, I really didn't—Freeport. Because of my experience with government, they sent me to Rocky Flats, Colorado, because Dow had the big contract up there on cleaning up after the big fire they had. Since I had worked around the government and was familiar with the government regulations and contracting, I went up there.

WRIGHT: Quite a difference in location from Florida to Colorado.

BARTON: Tell me. Working out there when it was zero temperature, you know. But I guess you get used to those things.

WRIGHT: I'm sure it was quite a change, too, from the family that you had been so closely involved with—

BARTON: Oh, yes.

WRIGHT: —in Gemini days, to move to these other types of work.

BARTON: Yes, I found in Dow a similarity, but not like we had on the Gemini. Dow Chemical was a close-knit company and it's an old family company, and the Dow family believed in the philosophy of everybody being close together, working together as a team. When I went to

Dow, they had just changed from that philosophy. The Dow family decided that they needed to change their philosophy, the family could no longer control Dow and grow Dow Chemical, because every cousin, aunt, and uncle wanted their share of the stock and dividends. Mr. Dow decided it was time to break away from the family, and they did so.

Dow began to really grow and became, as you well know, it's the second—I guess it's still second in chemical processing and manufacturing. So I think they had they stayed the way they were, they would have probably withered up and disappeared.

He brought a young man in from Allied Chemical, Ben Branch, who was a fair-haired boy with Allied Chemical, and, of course, they were number one. Mr. Branch brought the team together where they really grew.

WRIGHT: Well, as families do, families gather. And you recently returned from a reunion of the Gemini family.

BARTON: Yes.

WRIGHT: Would you share with us what all that entailed and so maybe some of the people that you got a chance to visit with while you were there?

BARTON: This last reunion was the third reunion we've had, and that stuff there explains it. Heretofore, the reunion had always been a joint reunion with the contractor people and the Air Force. It was decided at this reunion we'd have just an Air Force team reunion. About 150 people that showed up. Everyone remarked about how much nicer this reunion was than the previous ones. I think you can attribute that to the fact that they were all the Air Force team. You're back now to the old method of understanding each other, and your social environment was more—in the Air Force you had meetings or parties at the club, it was always the Air Force.

Your social gathering was always a little bit different, and this reflected that. Everybody let their hair down and had a good time.

General Albert, I say again, General Albert or Colonel Albert, that you can attribute it to him, because ... every two years wants the people to get together. We've lost several because of [them], but he leads the pack. We had a tour of—this time it was decided we'd have a tour of the facility led by the commander of the Air Force station out there. I guess they call it Cape Canaveral Air Force station now. So he conducted the tour and we visited all the old pads, and ended up on 19. That was the saddest part of the tour, to see the facility that we were once so proud of, grown up in weeds and rusted and all that. But it just goes to show you that we forget.

Then I later went over to 34, and there's a plaque over there on the pad over there for [the Apollo 1 crew of] Gus and [Roger] Chafee and Ed [Edward H.] White [II], and it was nice. I got some photos of that.

So the tour lasted about seven hours, and we got to see a lot of things that normally people didn't see. Everybody, I think, enjoyed it, because a lot of people, even though they were down there in some of the areas, they had never visited it.

Then we had a dinner that night, and, of course, everybody was telling their war stories. But it was one of the nicest gatherings that one would want to visit. I think, again, it brought back the old spirit of the people and that they reflected back on their participation in the Gemini and their private lives, which some of them hadn't shared before.

WRIGHT: So much of what you did, you did so continuously, you didn't really have a chance to have social time intermingling during those Gemini days, because you were working so much.

BARTON: Well, on the Gemini days, Colonel Albert had a policy—I shouldn't say a policy, but after every launch, the contractors and the Air Force crew met that night, either at one of the local hotels, or the officers' club at Patrick, and had a little get-together celebration. And I think

that did a lot to keep the people close. I think he had a lot of foresight of how to keep the people close, and at the same time let them let their hair down a little bit. Every launch, it would occur.

BARTON: As I say, he'd either have it at the officers' club or would select one of the hotels and that. So it was another way, in our opinion, he showed his appreciation for what was being done. Even the contractors were always invited to the thing, so he didn't draw a line, he kept that circle of team effort to go on all the time.

I didn't attend a lot of them, because I normally was working at the pad, and it was understandable because we normally had a schedule to put the vehicle up within two days after launch, because that's how tight our schedules were. So as I said, it was important to get the pad ready so that we get them up, and then I would my celebrating afterwards, I'd go to the golf course.

WRIGHT: Relax.

The people at the Cape were a family of their own, but yet you were a part of a larger family of NASA with new groups starting up here at Houston with the new MCC [Mission Control Center], as well as also the world tracking system that was being up. Did you deal much in your job with the folks here at Johnson Space Center and with folks around the world as well?

BARTON: No, Colonel Albert had people on his staff that did that. I only encountered—I came to Johnson Space Center twice. I came down for a meeting and was discussing some funding for the facilities and I came to that meeting with Colonel Albert. Then at the end of the program, several people were awarded awards, so we flew from the Cape. There was eight of us that flew to Johnson Space Center for the final awarding plaques and individual awards. I always told Colonel Albert, "You take care of the political end of it. I'm not much of a politicianer."

It used to be said that Barton will tell you in no few words how things go and that's the way it is. As I say, I'll admit, I'm not a politicianer, so I wouldn't be a good politicianer. I'll tell you what I think real quick and that's it.

WRIGHT: Apparently you're a very good communicator, because people knew what to do and when to do it and that's what made it balance so successfully.

BARTON: I started to bring something, but I'll mail it to you. I got a news article that I'll send to you and it will give you some insight. It's a news release about the Barton Free-Way. Katherine has got a copy of it, but I'll send you one. I've got some at the house. When I get back I'll mail you one.

WRIGHT: Be glad to have that.

We've mentioned about you were the mayor of the pad, but I also understand that you had another name before you moved into the NASA area, that you were called a gunner. Tell us how you got that nickname.

BARTON: Our friend, Wally Schirra, did that. Now, you understand Wally was Navy, and in the Navy warrant officers were always in charge of the gunnery crew. The gunnery crew on a ship ... was a warrant officer, and they always called him the gunner. So Wally started calling me the gunner, and he was the only one basically—well, Alan used to call me the gunner, but most of them just called me chief or Bart. But the gunner part came from Wally Schirra and I respected it. I told him one day I was a poor gunner. [Laughter] I asked him how difference in the Navy they call a gunner, and he says that warrant officers were only for one purpose, he says, "Run the gunnery crew," so that's how I got it. They called them gunners.

WRIGHT: So many titles, so many responsibilities. What brought you into the Air Force? You mentioned you joined about 1940, you started your career in the military.

BARTON: You see, when I went into the service, of course, it was the Army, and at that time then I was moved over to the Army Air Force. In September of '45 when the Air Force became a separate branch, why, you automatically become a member of the U.S. Air Force. So after the war, I decided to stay in the service. I had seven years. I look back and I say, well, do I want to get out, throw seven years away? Do I want to stay? What future do I have? What can I do? What education can I get in the service?

So when I weighed everything out, I felt that I could stay in the service and I could retire either at twenty years or thirty years and have a retirement. At the same time I could gain a lot of educational benefits, which I did. So it worked out basically, as I say, to my advantage. I didn't get my full degree, but I was able to get three more years of college while I was in the service, and I went to some pretty good schools, UCLA [University of California-Los Angeles] School of Engineering, I went to. I went to the Air Force Institute of Technology for eight months. So that, I think, basically prepared me for the future...

WRIGHT: When you were a young boy, did you have any idea that you'd be in the aviation field?

BARTON: No, had no ideas. At that time, as I say, as you probably know, we came out of the Depression, and at that time there was a lot of questions in people's minds as to what our future was, what the future of the United States was, having gone through a Depression, which as you well know and you've read about, that people lived just almost day to day and existed.

I can remember working for, when I was in high school and preparing to go to college, I worked three jobs just to get enough money to start to college. I worked at Kroger Grocery Baking Company and cut meat for \$12.50 a week. At that time was considered pretty top wages.

It taught you a lot of good lessons. I mean, it taught you how to survive. I think it taught me the points of values of life that probably the younger generation doesn't get today. At that time, a penny was a penny, and a penny you earned you saved as much as you could.

But as I said, I worked three jobs the first year of college. I worked for Kroger's in the afternoon and evenings, and went home and studied four hours. When I got up, I went and washed dishes in a restaurant to help suffice my income to go to college at that time. So it was a learning. At that time, I didn't have anything in mind, but how can I survive and make the best of a life.

WRIGHT: Well, you certainly had an interesting one, and one that's never been boring, it sounds like.

BARTON: No, I tried not let it get boring.

WRIGHT: Where do you call home? Where are you from originally?

BARTON: I was born in Ohio, but I would never go back to Ohio, because it's cold and I don't like cold weather. So I came to Texas in [1940], and I liked it. This is home. I don't like cold weather, and, of course, the service, they sent you where you didn't like—if you didn't like cold weather, you got to go to cold weather.

WRIGHT: Did you do your training in Texas, your Army Air Corps training?

BARTON: No, my training was rather unique the way I was—yes, the basic training I was sent to Chanute Field, Illinois, and I went to what they called the aircraft and engine training school there. I had twenty-six weeks.

After that I was sent to Seattle, [Washington] and went through an engineering course on B-17s. Then from there I went to Nevada and through what they call a gunnery course, and came back out of that, and then I was sent to Geiger [phonetic] Field, Washington, and was assigned a combat crew, it was for combat training. I stayed in that, was placed in a training command for training crews. I volunteered for overseas several times, but they wouldn't let us go because supposedly we were supposed to be essentials to training crews.

Then I went to the Pacific, and right after the war served five years in occupation duty in Japan with the Air Force. Then I came back in '50, and a year later I was back in Japan because of the Korean War.

WRIGHT: It was nice that you were able to move toward seeing aircraft become an achievement, as such, as going to the Moon and not just used for war purposes. I'm sure you enjoyed the transition from that.

BARTON: I read a lot of history about history and that's why I think history—there's a lot in literature and in books about Germany, about their development of missiles and that. I was always interested in that, and everything I could find to read I would read about it. Goddard always interested me, Dr. [Robert H.] Goddard. I've read probably most of his books on rocketry. It's always amazing, here was a man that had certain personals and philosophies and then he decided he would prove these things. As you all know, history is that he went out to New Mexico, he and Dr. [Daniel] Guggenheim, and that's where they first started firing rockets. I was always interested in that to see how that this was done. I ended up being in the big business with them.

WRIGHT: Of course, even though you worked with the Atlas so closely yourself, Saturn launch, as well.

BARTON: Right.

WRIGHT: Such a tremendous rocket to go, as well.

BARTON: Yes, I saw that. In the Atlas Program, there were three or four of us that would always get together and we'd talk. Since I'd worked around some solids, why, I often wonder why we can't strap a solid on the side of a vehicle and give it an additional boost. We were always worrying about the necessary thrust, first stage and to get through the initial thrust of the outer space. I often wondered why we couldn't strap something on it and here later on the thing is developed. As you well know, the Delta. I often wondered, why couldn't we take the Minuteman and put that on the side of the vehicle. Of course, that's about what you've got today with your vehicles. The capability of those two is about equal to a Minuteman. So I visioned these things and now they're there.

WRIGHT: Knowing that they would come true. It's quite remarkable what they're able to do with the technology, how it goes through its evolution.

BARTON: Yes. It's just like you're thinking about using the thrust vehicle, using fuel, who would have thought you could take liquid oxygen, or take oxygen and liquify it, and use it as a fuel to thrust something into space and then come along and use nothing but kerosene as another fuel and mix the two and develop an engine that would put you into space? Years ago nobody would have thought of that. Years ago nobody thought about liquid nitrogen or liquid hydrogen or liquid oxygen, you see.

But even in the early days that I started in the weapons systems, there was a lot of fuels, I mean, that's been developed since that, because we didn't have the technology basically. I mean,

people wrote certain theories about it and then we could do it. But to develop it and to make it work and harness it was a real, real challenge to us, and the American people rose up and challenged that, taken that challenge, and succeeded.

WRIGHT: I'll bet you saw quite sights at Wallops Island when you were originally there, all the trial and errors that happened.

BARTON: Oh, yes, Wallops Island when I went there, it was just a piece of land sticking out there in the Atlantic Ocean, a mile long, as we used to say, 500 feet wide.

It was interesting. We were working doing the sounding rockets into the Van Allen Belt. That was the purpose of checking the radiation from the detonation of some nuclear devices out in the Pacific to see. [James A.] Van Allen was a doctor out of Iowa that had certain theories about this belt that would collect around the Pole and what it was going to do. So the Air Force took it upon their own to really study this Van Allen Belt, and fired some from Johnson Island. Then we went to the East Coast so we could see what happened on this side of the world.

All we did, to show you how ingenuity is, we took two solid motors and stuck them together. We did not have electronic equipment to guide it. We used what we called the fins. We set the fins at certain angles for the first stage, which would spin your vehicle, then the second stage would bring it back on course. We put the nose cone on it and with the instrumentation, that's all we used, a simple rail launcher and it looked like a piece of a railroad track sticking up there.

We got these ideas from NACA at that time, which later became NASA, out of Langley Field. It was interesting. I mean, you never knew if it was going to work or not, and it was always funny, about when you got ready to launch we had a sandbag [area] maybe as high as that table, and it made [in] a U-shape, and the guy that fired, set off the detonation box, he's down

behind that and hit the trigger and then he'd jump up and run to get to the blockhouse. Things like that are a challenge. Today you wouldn't dare us to do that...

WRIGHT: Yes. I imagine the safety factors changed just a little. Maybe we know more to be careful.

BARTON: Oh, yes. But somebody, I guess, had to do it. I mean, the Army, of course, we used the Nike and Honest John [rockets], and, of course the Army, they had all kinds of safety devices. Here you are out there on a strip of land and you don't have all these buildings to go to, you see.

WRIGHT: Mr. Barton, if it's okay, I'm going to ask Sandra if she's got any questions to ask.

BARTON: Fine. Either one of you have questions—

HARVEY: I actually have several that I want to go back and ask you about. I wondered if whenever you were talking about the Atlas, you had mentioned the challenges that the Atlas posed for you. What would you consider the greatest challenges were during the testing of the Atlas Program?

BARTON: I think our greatest challenge was to make sure that we were doing it right, so that when we finished with the development of it we had a successful ICBM. Because what we were doing depended upon the success of that ICBM, and that ICBM, remember, was our first front-line defense for deterrent of any ally or foreign nation trying to penetrate us.

HARVEY: A couple of other things I was wondering about. You said you were the Air Force rep in the beginning for the Gemini Program. Were you actually stationed at McDonnell..., or were you actually a contractor or were the Air Force rep at the Cape?

BARTON: I was the Air Force rep at the Cape. See, what generally the Air Force always—when it had a project like that, it would assign somebody to represent the Air Force to see that the contractor complying with the contract and that all your equipment is going to be all according to the drawings and that. So that was my job basically. I worked night shift, second shift, and most of the work went on at night, because during the daytime they were working schedules and plans and that, and then at night they would do the work.

WRIGHT: Was this part of your being part of the Blue Suit Team? You mentioned that very briefly at the beginning of our conversation.

BARTON: The Blue Suit Team was, as I said, was where the Department of Defense decided, here we are, we're getting ready to develop and have developed a weapons systems, but we have no one in the military who has ever launched them. All the launches had been done at Vandenberg was done by the contractor. So they decided they needed to have a Blue Suit Team, they called it, all military. So that was developed at the Cape. The first military launch team was developed at the Cape. For training purposes, each man that was on the Blue Suit was assigned to a system, and worked right with the contractor until they got proficient enough that they could take over the system themselves.

Then once that happened, the contractor at that time was General Dynamics [Corporation], they backed off and turned the launch over to the Air Force, and all they did was furnished three or four people as technical advisors. That was called the Blue Suit Program. From that then Vandenberg developed the same capabilities, so they could launch.

You understand that the contractor did all the launching and the research program, and it was being costly, and yet the Air Force was not gaining any experience. Their crews are sitting back and watching and reading the rules and regulations and procedures, but they did not have the hands-on procedure. That was the purpose of the Department of Defense, said we must have somebody who has the capability of pushing the buttons. So you can't just put these people in the blockhouse and let them sit there, or in a hole.

As it later developed, Vandenberg crews out in the field like Nebraska, Fort Warren, would be brought into Vandenberg and then to launch their vehicles from there for training.

HARVEY: I have quite a few other questions I wanted to you ask about, and that is the development of range safety. You had mentioned the fact that you really were literally having to develop things as you went along with each of the testings. How did you know what was a safe distance? How did you all determine where was the best place to be, what was considered the area that would be the greatest threat to people? How did you come up with all that?

BARTON: We didn't develop that as much as it was already pre-developed by, at that time we had TRW, Thomas-Ramo-Woolridge, as you know, was an advisory team to the Air Force that did studies. The Air Force asked them to do studies and tell us what is a safe range for people to be around in these areas to blast and that. Taking that, that was developed, and then we would put it in effect.

Now, as far as the range is concerned, we didn't have that much problem or encounter with the range. The range developed their own procedures and then we had to comply with what the range developed. Now, around the launch pad we developed our areas, safe areas, because we had certain factors and criterias on explosives and these things, so you developed your area. Now, it didn't always work out right.

In the Mercury Program, we had one vehicle lifted off at 14, it had a failure of the gyros, and the vehicle went straight up. I mean, it went straight up. They let it go as long as they could before it began to lose and fall over, they blew it up. I was on 11, and 14 was three pads away, and to show you how the disbursement is, parts of that vehicle fell in our complex. So you can't develop a pattern. Of course, after that, we knew what the pattern was. We knew that the engines, being the heaviest part, the engines came back, part of them came back into 14 and one of them hit on 12. So from that day on, you knew that if you had a vehicle lift off and it went straight up, that you had to have everybody secure in a blockhouse on that, see. Even two pads away you had to do this.

Now, Centaur blew up. We were on 11. Centaur was the next down the road. It blew up and it blew parts of it into our pad. So here we learned from that that the distance between the two pads with the Centaur was not like that of the Atlas. So that's how we learned some of those things.

But the actual range work is done by range people, and we had to comply with their policies. Of course, I always say, you never knew what was going to happen. They had a Minuteman took off and turned late over like that and flew straight towards Savannah, Georgia. So you can't tell, that's what I'm saying. Every vehicle's peculiar. You see something like that and it makes you think, well, their philosophy was they didn't want to pop it while it was flying like that because they were afraid it was going to hit some shrimp boats or fishing boats or something like that. But they learned from it, they almost lost control of it, so there was a learning curve from that. So that's how these things are developed.

HARVEY: Did you have any problem with any of the press getting into an area that they weren't supposed to be in, and you find out after something has been launched that the press is there? Because you mentioned that some of the press was a little tenacious sometimes.

BARTON: Gemini we had excellent control over the press. First thing, as I said, I think what gave us control was that the Air Force Eastern Test Range, their PIO man, Major Zerring [phonetic], became the point where he could trust us and we could trust him, so we worked very close. Now, we had a system set up that anybody in the press that wanted to get on the press had to call either him or call Colonel Albert's secretary. They, in turn, would call me, and we controlled it that way.

Now, only one occasion did I have a problem with press people, and that was Jules Bergman. You had to know Jules Bergman. Bless his heart, he's deceased. He was with ABC [Inc.]. Jules wanted to be first in everything. The rules that were established for press people didn't affect him, he thought. We caught him one day, he had drove in and went down one of the fence lines and was sitting down by the fence when I was informed about it. So I sent the security people down and got him and brought him back. That's the incident I had.

There was incidents I was told, there were other incidents, but the ones that affect me—now, I think since we had very good control, if NASA wanted to have people in the press, Gemini, or if NASA had somebody that wanted to visit the pad, they had to call Colonel Albert and he, in turn, would call me and tell me that so-and-so was cleared to come to the pad. So that's the way we controlled it.

Of course, you've got to understand the press, they wanted to know what was going on, and you have to put control on them. I think you see that today. If you don't, they're right in your hair.

HARVEY: You mentioned the E Program, and I'm not necessarily familiar with what that is exactly. What is the E Program?

BARTON: The E Program?

HARVEY: You'd mentioned it—

WRIGHT: The Atlas E.

BARTON: Atlas E. See, the Atlas models went from A, B, C, D, E, F and G. Each time a vehicle was modified they redesignated, like the D was modified, the D program was modified, and that vehicle became the Atlas E. Then the Atlas E was modified, a major mod, and it was called the Atlas F. The E and F were the ones that went into the defense systems. That's what the E program was.

HARVEY: I have a couple of other questions. You had mentioned your relationship with the astronauts. When you look back at those and you think about the people that you've worked with, what are the most fondest memories that you have of those people that you worked with, as well as the astronauts themselves?

BARTON: My fondest memory, I can tell you this with all of them, including the launch crew, was the friendship and fellowship that was developed. I mean, at the point that when you talked to one another, there was a respect for each other, and at the same time, if there was some problem that I felt you could discuss it freely without having somebody get upset over it, or somebody feeling over-jealous about it. With the astronauts, particularly, I felt dedicated, if they had a question, we had to answer it. I mean, don't push it off, because it was their life.

As Gus said to me one time, there was a little bit of a problem with something, and he said, "Chief, would you fly with me?"

I said, "You bet."

He said, "Well, if you're willing to fly, then I know it's okay."

So I think this was—well, my greatest challenge was to make sure that they always had the answer and that they were satisfied with the answer, because it was their life and not mine. I think this is one of things we try to instill in all of our launch crews was, don't look at this from the standpoint that you're going to gain, look at it from the standpoint that that crew is the one that has to have that information for them to make certain decisions. So if they're up there and a problem happens, I mean, you can't help them. I think, and I can say again, that program probably was the first program that had really developed the integrity and honesty among the people.

HARVEY: The Gemini Program?

BARTON: Gemini.

HARVEY: Did you maintain a relationship with many of the people that you worked with after you left NASA?

BARTON: Oh, yes, most of them. Colonel Albert and several of the people we maintain—John Eberly that worked for me, we maintained a closeness. He passed away about five years ago. I maintain a very close relationship with his family, because, after all, we were all together and worked for each other and I see them quite often. As I say, I maintained a close relationship with Gus, even after I left the Gemini, and I see John Young occasionally. Alan Shepard, the late Alan Shepard, I went to his services.

I think that because of the closeness of the crew, you don't forget the people. I think I can also say that they were deep-seated Christians and had a strong brotherly love for one another. You were always concerned about them, as well as you were others, as yourself. Even the

families are close. My daughters are very close, they go to the reunion and they're accepted at that reunion just like the rest of them.

HARVEY: It seems like a very nice situation to be in, or to have been in at that point in time. Did Gus ever talk with you after you left about the problems he might have had with the North American?

BARTON: Oh, yes, Gus talked to me several times. Gus asked me to come over there and go to work for NASA and I finally explained to him why I didn't want to. I think you're asking a question, and it's no reflection on NASA, but all of you understand that when NASA went together and formed their own launch crew that they did not hire a lot of experienced people. One of the things that was required is you had to have a college degree. They hired that way, and they put a lot of people into key positions that had a college degree, but they didn't have the hard-core experience, and probably didn't understand the philosophy of what a team was. This is what Gus and them missed. I mean, Gus told me several times, "We miss having somebody we can go to and ask a question."

The day I had lunch with him he had some concerns about that test that day, we discussed them. So I think as a result that we lost Gus and Ed White and John [Roger] Chaffee, a terrible loss. But I think it taught NASA a lesson real quick that they had to change their philosophy if they were going to be successful. Because if all of you remember now, that as a result of that accident General Phillips, Sam [Samuel C.] Phillips, who was our leader on the West Coast at the time of the Gemini, and him and General Funk [phonetic]. General Phillips was called back to duty and put in charge of the Apollo program. It was through, I think, his effort of molding the philosophy of NASA into what the philosophy was basically of the Gemini, it was a team effort. It's a shame we had to lose a couple of people to get that changed.

WRIGHT: Of course, for you it wasn't just people, it was close friends that you lost.

BARTON: Oh, I hate to tell you, I mean, having met Gus' father, and Gus and I were like brothers. I mean, rank meant nothing with Gus and I, I mean, we could sit down, we'd sit down out there on the pad and talk about things. I think that the thing hit me very hard.

WRIGHT: Did you have any doubts that the space program would be able to revitalize itself and move on after the tragedy?

BARTON: Well, when I saw that due to the investigation that they had that I felt it was [not] thorough enough that when they appointed General Phillips to lead up, head the Apollo Program, that they at least would head in the right direction. General Phillips was one that was not a believer in failures. I mean, he believed in success. He believed in doing things the right way, or he would have never risen to the position he had in the Air Force. As you know he was head of the weapons systems for several years before he retired. I felt that with his experience and knowledge that NASA should gain a lot from it, which they did. I mean, he gave a lot of operational philosophy and he made them shuffle people around and put them in key positions. I think that's what lifted them up.

HARVEY: Thank you. I'm done.

WRIGHT: Well, we certainly have enjoyed listening to the experiences that you've had. Are there other areas or topics that we might have missed that you'd like to talk about?

BARTON: No, I think we've covered the main ones. As I said, I'm primarily interested that we get into history books and some form of permanent information that my children, my

grandchildren and their children's children, and all of us that can—kids like to read history and so let's give them something that they can thrive on and live on and maybe challenge them. I don't think we're challenging the younger children today and the young people today, in my opinion, are not being challenged enough.

Just off the record, I noted the other day in an article in a magazine I get that the Air Force has started back into schools and college having the Air Force ROTC [Reserve Officer Training Corps] now. I think that was the greatest loss is when they canceled those programs. I think that there's always a certain percentage of children in school that like to be challenged, and if anything's going to challenge them, challenge them with AFROTC. We challenge them in sports. We have pro basketball and pro football and pro baseball, but why not challenge them in the scientific field. I'm glad to see that the Air Force now, well, I guess all three, all the services, have gone very strongly in this Air Force ROTC. I think it's really going to develop us future leaders and future people in the scientific and the military fields.

That's what I think, I expect you people, or whoever set up this program, is that you can at least give them a library they can use to understand better what people here before them encountered and how they met these challenges and how they successful succeeded in those challenges. I think space challenges is one that probably is we need a challenge. I think because we're going to have use space. I mean, there is a day coming we're going—I foresee it. I'm disappointed NASA didn't continue to use the Moon. I think we could have factories on the Moon, and things.

Colonel Albert and I and some of them were talking the other day that we think this is the biggest disappointment we see with our space program that we didn't do enough research or we had more things in our mind of going other directions, rather than capturing what we have now and develop it, use it. I think that if Russia had had the expertise we have they would be there. That's my opinion.

So we're going to have to use the Moon because man's mind is getting inquisitive and they're going to want to reach further out, so it's like going across the United States. We have to have a refueling stop every once in a while, so I think that should have been developed.

WRIGHT: Possibly it will. One of our goals is to try to capture as much history as we can with the individuals who made it.

BARTON: Right.

WRIGHT: Again, we certainly thank you for taking your time to spend with us this morning. We wish you good luck in all those adventures you're going to have soon.

BARTON: It's been my pleasure, really, and as I say, if I can be of further help to you, why, all you have to do is let me know.

WRIGHT: We certainly will.

BARTON: Okay. Thank you.

WRIGHT: Thank you.

[End of interview]