

ORAL HISTORY TRANSCRIPT

PAUL E. PURSER
INTERVIEWED BY SUMMER CHICK BERGEN
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BERGEN: Today is February 3, 1999. This oral history with Paul Purser is being conducted at the offices of the Signal Corporation in Houston, Texas, for the Johnson Space Center Oral History Project. The interviewer is Summer Chick Bergen, assisted by Carol Butler and Sasha Tarrant.

Mr. Purser, we're glad for you to be here.

PURSER: [What was going on in aviation in 1914 was that] the government sent this group to Europe to find out, really, the status of aviation. They came back with a report that they had 1,400 military aircraft. The United States at that time had fourteen. This was somewhat upsetting, and in order to approach that problem, Congress established the National Advisory Committee for Aeronautics [NACA] to try to catch this country up with Europe. It worked very well, because by the mid-thirties, we were the leading aviation country, the only producer of real transport aircraft, the DC-3, and really established a world-preeminent status in aviation.

During the late thirties, they again got concerned in Washington [DC] about what was going on in Europe and sent Charles Lindbergh to Europe to review again what was going on there compared to what was going on here. He reported, much to the disgust of the press, that Germany was really making strides, particularly in military aviation. The press was so upset about it that they almost drove Lindbergh out of the country, but Congress, as they had done in 1915, listened, and they told NACA, which at that time had a total of, I think, less than 700 employees, to be prepared to start expanding.

Henry [J. E.] Reid, who was the director at Langley [Research Center] at that time, wrote to all of the academic people he had had any contact with around the country and said, "Get your best aeronautical engineering, mechanical engineering seniors to take the Civil Service exam that's coming up in the spring of '39, because we're going to be hiring like mad."

At LSU [Louisiana State University], I think the whole senior aeroengineering class, twelve, I think, took the exam, and we had to wait. The mills of the gods ground slowly then, just as they do now. One of our class, Lindsey Lina, L-I-N-A, was hired during the summer of '39. I got a call in early October and came in in October of '39. Walt [Walter C.] Williams got a call about six months later, and Harold Sweberg, who was one of our senior class and had taken a fellowship at Caltech, got his offer at mid-term, and he jumped on a bus and rode it all the way across the country because he was having trouble supporting himself on a master's graduate fellowship, and his family in New York needed help. So he came and joined the group at Langley.

Then in succeeding years, more [LSU] people showed up, and after the war, when the Pilotless Aircraft Research Division [PARAD] had started, again in response to what had been going on overseas, because by that time we found out more about what Germany had been doing in rockets and turbine engines and high-speed flight in general, and the wind tunnels were just at that time not capable of operating near the speed of sound.

[Robert R.] Gilruth, the Center's [Johnson Space Center's] first director here, was in the Flight Research Division, and he started looking for ways to get aerodynamic data at the speed of sound, and one of the ways was to mount a small wing in the high-speed air flow over the wing of a P-51 fighter plane. Another way is to put surplus military rockets in models and fly them up through the air, track them with radar, and use telemetry to measure the forces on them. That was how the Pilotless Aircraft Research Division started, was doing that.

During the war, I had been working in and ended up running a wind tunnel, low speed, eighty miles an hour, but in one way or another, I and the other people in the group worked on, I think, almost every airplane that the U.S. used or had proposed for use in World War II. So we had a lot of aircraft experience. With the Pilotless Aircraft Research Division, I got a lot of experience; live experience and with models in free flight, and after we started getting them to high enough speeds for aerodynamic heating to become important, Gilruth set me off to the side to try to develop ground-based high-temperature facilities using the ... people at Langley who were used to designing test facilities and things. Caldwell [C.] Johnson, who was one of the chief design people in Project Mercury, was one of that group. So we developed various facilities, that and flying models. I think at that time we had gotten models up to Mach number 15, which is about halfway to being able to go into orbit, but it was still faster than anybody else had been.

[Maxime A.] Faget and I and Chuck [Charles W.] Mathews, who was here for a while, and several other people worked closely with Faget, collectively, with Faget providing, I guess, the primary sparks, came up with the idea of Project Mercury. At the same time, the NACA was continuing to work with the Air Force on the research airplane projects, and they were looking for the next step beyond the X-15. We had a conference out at the Ames Research Center of people from Langley and Ames, the Flight Research Center, the engine lab at Cleveland, and NASA Headquarters, or NACA Headquarters.

While we were there, we were really looking primarily at something like what Boeing had proposed to the Air Force, a Dyna-Soar, a long, slender, triangular aircraft that would be flown with power to very high speed and then allowed to just coast, to glide, with an eventual range of 12,000 or more miles. That was in line pretty much with what the then-director of Langley [Floyd L. Thompson] had kind of preached for many years, that eventually our aim should be to be able to fly anywhere in the world in an eight-hour day. You have to take off from that a couple of hours in getting to the airport and maybe a short commuter flight to the

big airport and then some time on the other end. It was going to mean that you'd have to go to very high speeds for the long-distance part of it. So even though, in those days, space had the same connotation as many four-letter words do now in Washington, by looking at it from Thompson's viewpoint of how can we keep going higher, faster, and farther to get to this ultimate goal, and the Dyna-Soar thing looked fairly reasonable.

Right in the middle of that conference, the Soviets flew Sputnik, and that kind of turned our little conference into somewhat of a turmoil. The Air Force—I don't remember whether it was six months prior to that or a year prior to that—had a top-secret or possibly higher classification than top secret, conference to which a few NACA people were invited. One of them was Al [Alfred J.] Eggers from Ames and one was Bill [William J.] O'Sullivan [Jr.] from Langley. The conference was so highly classified that Dr. [Hugh L.] Dryden, the NACA director at that time, told the NACA attendees that they could not even tell their home-based supervisors what the subject was.

O'Sullivan was part of the Pilotless Aircraft Research Division. He had not told any of us anything about it. Eggers was in something of a middle research management position at Ames, a very bright guy. He had not told any of his people about it, but he had done a lot of thinking and had modified some of his research plans to accommodate work on re-entry bodies. He, in front of the NACA hierarchy who were there, had the guts to get up and tell us just enough about the subject of the conference to let us all know that the Dyna-Soar was not the way to go. Faget had been thinking that for other reasons for almost a year by that time, and so he got up and told us what he thought about what finally became Project Mercury.

Al Eggers told us about his proposal for a lifting body, being somewhere similar to what is now being proposed as a crew rescue vehicle, but at that time we wouldn't have been able to meet the weight requirements for reaching orbit, whereas the Mercury spacecraft

would be able to, we felt. That just completely turned us around from looking at the Dyna-Soar concept and got us concentrating on what became Project Mercury.

Sputnik got almost every scientific group in the country eager to be what eventually became NASA [National Aeronautics and Space Administration]. Dr. Dryden was not personally in favor of that, but he did something that our Washington hierarchy has very seldom done since that time. Instead of doing what he thought, he talked to the people in the Centers and became the driving force that although he did not really personally believe it was the right thing for NACA, he was convinced by the people in the Centers that it was the right thing for the country, and he was the real promoter of NACA becoming NASA.

There wound up being a group of about twelve of us working under Gilruth, developing ideas for Project Mercury, so we spent about six months pretty much concentrating on that. Then when it began to look like NASA was going to be formed somehow, they pulled a bigger group into Washington [DC] from all of the NACA Centers. It turned out, because primarily of the geographical proximity, Langley and Cleveland [Lewis Research Center] were the most heavily represented of the groups, but during the summer of 1958 there were, at various times, from fifty to seventy-five people from the Centers collected in Washington [DC] finding out what we were going to have to do to make sensible progress as a space agency.

Then in July, when the Space Act was passed with NASA to come into being and active on October 1 [1958], we concentrated on how do we convert NACA to NASA. NASA then came into being officially the first of October '58, which was just three or four days less than one year after the Soviets had slapped us in the face with Sputnik, and I don't think Congress has ever reacted as quickly to anything as they did to that. There was a complete new agency with new ideas and new projects within just under a year.

The first administrator of NASA [T. Keith Glennan] came into office officially on the first of October. He had been working with the people in Washington for some time before

that, I don't know how long, whether it was a week or two weeks or a month or what, but he was not completely unaware of what was going on, but one of the first things that he did was ask Gilruth to come up and make a presentation on Project Mercury. Gilruth and Charles [J.] Donlan, Max Faget, maybe Chuck Mathews went up to Washington to meet with Dr. [T. Keith] Glennan.

I was off somewhere else doing something, I don't remember now what, but it was part of Mercury and various others. We kind of scattered all over the country at times collecting information, but at any rate, they made the presentation on Mercury, condensing quickly a lot of what I just said about the early history. As Dr. Gilruth told me when he finished, Glennan said, "Well, I think you ought to get the hell—" and Gilruth thought, "Oh, my God, he's going to say 'out of here.'" Nope. His next words were "on with the project." So Gilruth said, "Yes, sir. We will do that."

He came back to Langley and told Thompson, the director, that Glennan had said we should get on with the project, so he and Thompson together put together a memo setting up the Space Task Group. And that's how we came into being. The memo was not signed by Washington. It was verbally blessed by them later, and really, neither Gilruth nor Thompson had any authority to do that except that the new administrator of NASA had said, "Get the hell on with the project." So they did.

Thompson made space available for us at Langley and provided an awful lot of support in every way. That was how we got started. Then when [President John F.] Kennedy decided to really put us on the map with Apollo, we still had not flown any of the Mercury spacecraft at that time, but he said we were going to go to the Moon and return safely within the decade, and so we had to do something other than just occupy borrowed quarters at Langley, and that was when they got started looking for sites for what is now the Space Center here in Houston [Texas].

All of us in the Space Task Group, while we had nominal positions, were really working on almost different things every day, whatever needed to be done. I was working as an assistant to Gilruth, and he called me a special assistant because I had the task of doing almost anything that he felt he couldn't do, didn't have time to do, or didn't want to do. So I had some contact with almost everyone in the Space Task Group, and as we developed into the Manned Spacecraft Center down here with the larger group there.

We had grown as NACA from just under 700 people when I joined it in '39, to, I think, around 8,000 at the end of World War II and [then] had grown very little more. We still were around 8,000 ten years later in '57 when Sputnik flew. Then in '58, with the formation of NASA, we began growing, partly by absorbing some groups that were already in existence, [but] to a large extent by hiring new people, but people, hopefully, with some practical background and experience in addition to just having degrees.

When we came down here [to Houston]—really, before we came down here, we started giving a series of lectures to the new employees and some of the old employees to kind of acquaint them with what needed to be done. Sometime in '63 or '64, "Shorty" [John A.] Powers, who was head of public affairs at that time, said, "Gee, this would make a great textbook on spacecraft engineering." So we put it together. "Shorty" had some contacts with Fairchild Publications, and he got them to publish it for us, so it was the first graduate-level textbook on spacecraft engineering. It came out of the Space Center here in 1964, and Faget and I and Norman [F.] Smith were the editors of it.

I wrote the first chapter and the last chapter, because the guy who was going to write the last chapter never got around to it. We had various people working [on their specialties] writing the chapters in between. But we had to do it all on our own time, so it meant that I had to take the stuff home with me, proofread it, and get it set up. My wife typed it. It's about a half-million-word book. I proofread stuff before I gave it to her to type. I proofread what she typed. We sent it to the publisher, and I proofread galley proofs and page proofs

and final proofs, and that half-million-word book came up with one typographical error that I know of, and it was on something that I didn't proofread. It was the little statement in the front pages that usually says "All rights reserved." It didn't have an "S" on the "rights." "All right reserved."

In a way, that is kind of what we did with the spacecraft. We essentially proofread every step of the way, and we still couldn't keep out all of the errors, but we pretty well minimized them.

[It occurred to me on this reading [of the transcript] that I had not mentioned the Russian translation of our "Manned Spacecraft" book. The interesting part is that the Russians did not translate every chapter—only 36 of 47. I guess they only bothered with the chapters they felt they could learn from; and they didn't bother with the material that they already knew.]

BERGEN: When you were working on Mercury, you did some work on the development of the heat shields?

PURSER: Not specifically on the development of the heat shields. Most of that work was done by Faget and people working directly for him. My contribution to that was one of the ground-based high temperature facilities that I had been in charge of developing, which was a very high-temperature supersonic wind tunnel, really. It had a Mach number of between 3 and 4, and it had a total temperature of the air of 4,000 degrees Fahrenheit, which is enough to melt almost any known material at that time except maybe diamonds. We needed to test heat shield materials not only for Mercury, but basically for ballistic missile work.

An interesting thing, we had tested various metals, various shapes, various other materials. Gilruth and I, and I don't know whether anyone else from our group was involved or not, but at least Dr. Gilruth and I went to a meeting in Secretary [Neil H.] McElroy's

office. He was Secretary of Defense at the time. The subject of the meeting was whether the Redstone group under Dr. [Wernher] von Braun should be allowed to develop what's called an ablative heat shield for the Redstone missile, or whether they should try to develop one of the metallic heat shields that the Air Force was working on for the ballistic missiles.

One very prominent man who had started his career at Langley and had left and gone into the academic world and scientific consulting after the war got up and said, "Well, it's really very simple. Just go ahead and make it out of smooth stainless steel and don't worry about all this ablative stuff."

So Dr. von Braun said, "It won't work."

And I said, "It won't work."

"Why not?"

I said, "Well, we've got this high-temperature jet down at Langley, it's to a temperature of 4,000 degrees, which is about what the Redstone would reach on reentry, and I'd like to show you some pictures of some tests in it." I showed him a picture of a stainless steel nose that burned like a flashbulb.

Dr. von Braun said, "See? I told you it wouldn't work."

And the prominent scientist sat down and shut up. He did a lot more talking later about other things, but he didn't talk any more in that group that day.

BERGEN: You mentioned Dr. von Braun and the Redstone. Were you involved in acquiring the Redstone for use in the Mercury Project?

PURSER: To some extent I was. I think that probably Jack [C.] Heberlig did most of the work, but I did some of the kind of opening negotiations. At the time, for some reason, Dr. von Braun and I could get along very well. Walt Williams couldn't get along with him at all. They just drew sparks off each other. I don't know why, but they did. Sometimes Walt and I

drew sparks off each other, too, even though we were classmates at LSU. But anyhow, that was my involvement, kind of the initial negotiations and so on. Jack Heberlig did most of the detailed negotiations after that. There was a lot of give and take, and von Braun was a very—quite a stubborn man, but so were we, but we finally reached agreements because, although very stubborn, he was also willing to listen and learn. I think I helped us smooth the road for dealings with him.

BERGEN: Did you feel confident about putting a man on top of a rocket when you were doing Mercury?

PURSER: Yes, because we were going to check everything out ahead of time. We couldn't guarantee that it wouldn't fail, but we weren't going to do anything that we were not very confident in working, having done enough ahead of time so that we were not going on theory, we were going on the basis of solid experiments.

BERGEN: What role did you play in the decision to advance from the Redstone to the Atlas after Gus [Virgil I.] Grissom's MR-3 mission?

PURSER: You've got it backwards. We didn't advance from the Redstone to the Atlas. We chose the Atlas because that was the biggest, most powerful rocket that the Air Force had either flown or was getting ready to fly at that time, but it was not going to be ready in time to do some early testing. The Redstone was an operational missile at that time, and it looked like we could get some actual flight experience with the launching, the separation, trying out the escape rocket, things like that before we could ever get a useable Atlas to work. So we didn't progress from Redstone to Atlas; we chose Atlas and came back to Redstone because of what we could get hold of.

PURSER: Also, in order to try to get something even quicker than Redstone, I started playing with the idea of taking four of the largest solid propellant rockets that we had in our stable at that time and putting them together and firing two of them, and then later firing the other two to carry the spacecraft up to pretty high speed and altitude and try the separation and so on.

That was what Faget and Caldwell Johnson developed into the Little Joe. The name "Little Joe," if you've ever played dice and you look at the four on a die with rounded corners, and it's four dots just like the four rockets that we had [clustered in one round shell]. Little Joe actually is two deuces, but it's also four and the die with four on it, one die with four spots, and that's where "Little Joe" came from. That, I think, was possibly Guy [Joseph G.] Thibodaux's contribution, the name. I don't know. It was either his or Caldwell Johnson's.

BERGEN: Was the Little Joe formally known as the High Ride, or was that something different?

PURSER: High Ride rings a little bell, but it's a very faint bell. [Laughter] I mean, I'm not really sure about it right now. [It may have been a proposal that von Braun's people at ABMA (Army Ballistic Missile Agency) made very early in the space game.]

BERGEN: Okay. During Mercury, McDonnell [Aircraft Corporation] was the contractor for the spacecraft. What interaction did you have with that corporation?

PURSER: I had very little direct contact with them. I was primarily, as I said, doing the things that Gilruth couldn't do, didn't have time to do, or didn't want to do. So I did have some contact with them. I was part of the group that went up to Canada when the Canadian

AVRO CF-105 fighter plane was canceled and the A.V. Roe plant in Toronto was going to have to almost shut down and wanted to have places for some of their better people to go. So they offered us opportunities to come up and recruit some of them, and after some very quick and intense negotiations in Washington [DC], we got the approval to do that.

Gilruth and Charlie Donlan, Chuck Matthews, me, and I don't know whether Faget went with us or not, but we went up to Toronto, and the AVRO people took us in, gave us freedom to talk to anyone we wanted to in the plant. They had a kind of shopping list of people they thought we might like, and we spent a whole day, each of us, interviewing several of them, and wound up the day with about thirty that we thought we would like very much to have. I think it wound up that twenty-seven of those thirty actually came down here. Jim [James A.] Chamberlin was probably the senior one of them, but Bob [Robert E.] Vale and Tom [Thomas V.] Chambers, Les [Leslie G.] St. Leger—my memory's slipping on me. There was a time when I could have named every one of the twenty-seven for you. [Laughter]

BERGEN: What impact did these engineers from AVRO have on the space program?

PURSER: They gave us a wealth of high-level, practical experience because they had been involved in designing and flying hardware, and we were having to expand our work force. We could get, very easily, new graduates with lots of theory knowledge but very little practical knowledge, but the aviation industry was growing pretty rapidly in this country at that time, and so it was hard to attract people that had experience as well as just basic knowledge. They gave us a major infusion of excellent background and experience.

BERGEN: We've heard lots of good things about the engineers that came from Canada. You said that as special assistant to Gilruth, you did a lot of things that he didn't have time to do or didn't want to do. Are there any of those that you can think of that stand out in your mind?

PURSER: Well, when we moved down here [Houston], almost everyone bought a lot and built a house or bought a house already built, not quite within walking distance of the [Johnson Space] Center, but almost. My wife and I decided that if we were going to move from the little country town in Virginia, Hampton, where we had been for twenty-three years, to the big city, we might as well take advantage of the big city. So we were among the few people who settled in Houston rather than out here in the Clear Lake area.

As a result, there were many things that just being in Houston after work hours I could take care of, contacts with the Chamber of Commerce. There was always somebody that wanted someone from the Space Center to come talk to their group and tell them [about NASA], so I drew a lot of those short straws. I was in a high enough position that when they had a prominent visitor that someone wanted to entertain, we could do that.

One very interesting thing, King Hussein [of Jordan], who has been in the news recently, was visiting Houston. I don't remember whether it was '63 or '64, but it was in that time period, and John Mecom was having an evening soiree to let him meet some of the prominent people in Houston, and Deke [Donald K.] Slayton and I drew the short straws for that. Deke and Marge and I and Dottie got to the Mecom place at about the same time so we parked our cars and the four of us got out and walked up to the door. Marge reached up and tapped on the door, and it opened, and this voice said, "Come in. I'm King Hussein." Marge looked around. She didn't see him. She looked down, and there he was. [Laughter] She was about six or eight inches taller than he was. So she stuck her head down and said, "I'm Marge Slayton." Then Deke and Dottie and I went in and introduced ourselves. It was a rainy, blustery night, and we [had] run up to the door. The king said, "Good evening. I'm

King Hussein," and Marge looks around and didn't see him. We did a lot of those things, that kind of thing. We had a very good time.

I was also the primary center's contact with the educational community, the University of Houston [U of H], Rice [University], [Texas] A&M [University], the University [of Texas] in Austin. At one time I had either a president or vice president of each of those four universities gathered around a table in my office asking them to help us arrange for interchange of credits among the four universities because some people might want to go to Rice for one or two courses, or to the U of H for one or two under a different professor, or A&M, or [University of] Texas at Austin.

This was not a very popular idea, because graduate school deans are very independent souls, and they don't like to be told that they have to accept somebody else's credits. But we reached an agreement that with proper safeguards of review by actual graduate school faculty and so on, that not only would they accept credits from those four, but they would accept, in some cases, credits that people had gotten from a University of Virginia Extension group that had taught several courses at Langley. That was, I think, a first in academic history, because even the University of Virginia wouldn't accept the University of Virginia Extension graduate courses. He could do the basic work at Langley, but he had to go spend a year at the University of Virginia taking some of the courses there. [A student] could write his thesis under supervision of selected people at Langley, but he had to spend a year, [or 3 summers], in Charlottesville [Virginia].

Anyhow, that was one of my jobs of dealing with the academic community, and that, I guess, is how I wound up spending my last year on loan to the University of Houston to get the Clear Lake Graduate Center on the ground instead of off the ground.

BERGEN: During that year, what was NASA's objective in sending you to the University of Houston in that position? Because you still worked for NASA, right?

PURSER: No, I didn't. I was on leave from NASA. They gave me a year's leave without pay, and I would work for the university as special assistant to the president to help get the graduate center [started], and it worked out fine because we had the official ground-breaking three weeks after my year was up.

Then my hearing was giving me trouble, so I asked my next-door neighbor, who was a surgeon, who he would suggest that I go see to get a hearing aid, and he said, "I wouldn't suggest that you see anybody to get a hearing aid. I suggest that you go talk to Dr. Ed Maddox, who is an ear, nose, and throat man and find out what's wrong with your ears." So I did. He found that I had a tumor on my acoustic nerve on the left ear, and in just about ten minutes of office visit, he reached that conclusion with what he felt was a 95 percent certainty. [Then] he made some tests and did some x-rays and so on and confirmed it. He said, "We'd better do something about it right now. Otherwise, two years from now you won't be here."

So I was ready to go back to work except for getting my ear taken care of [at the] end of October. I finally got back to work part time the first of April and in time to retire.

BERGEN: And you worked as a consultant for NASA?

PURSER: No. I was on the list of NASA consultants, but I don't know of anybody on that list who actually was consulted with. [Laughter] I did work as a consultant to [the] General Electric Space Division, trying to help them get some of their ideas into the non-space market, and through contacts that I had made through a Chamber of Commerce Science Committee that I had served on while I was still working for NASA. I made contacts with some of the oil industry people and did some work for them.

Geoff [Andre Geoffery] Buck and Manley Hood and someone else from Ames Research Center were working with the Stanford School of Medicine Cardiology Division on applying space technology to medical problems, and Jeff contacted me and asked if I would like to join them in it since I was here and could get my hands on things here much more easily than they could by telephone and writing, and I said, "Sure." For, I think, about five years we worked with Stanford, and every year we had an international conference kind of reporting chunks of technology that would be of use to the medical community.

On the first one, I took Dottie along, my wife, and she didn't know anybody at the place the conference was being held, so she just came with me to work on it, and they put her to work as a gopher, and the next five conferences they did the same thing. They said, "Bring her along, and we'll make a gopher out of her." So she got her airfare and hotel and had a lot of fun gophering.

We always invited Soviet input, and they always accepted but didn't show up. One time they [did show] up. A conference was held out in California at [the Asilomar] Conference Center [near] Monterey or [Carmel]? Anyhow, [it was] between Monterey and [the] Pebble Beach Golf Course. Dottie's gopher job there was to take people on the seventeen-mile drive [of] the Pebble Beach area. This time the Soviet representative accepted and showed up, along with three KGB agents. They were not hidden as KGB agents. It was a part of the party, three KGB agents, eight hours each. So he was protected for twenty-four hours a day, not protected from us harming him, but protected from us talking him into staying here. [They were] very open about it, and when he gave his speech, they felt that he wasn't likely to run away in the middle of his speech, so they went with Dottie on the seventeen-mile drive. She was not real thrilled about the idea of driving around a strange countryside with three KGB agents, but she did it and said it was a very pleasant drive, a really nice drive, real nice guys.

What that man had done, he was a shot-putter, and after his competitive days were over, he was teaching at the Soviet Academy of Athletics, and he tied a computer and appropriate sensors to shot-putters and followed their motions in putting the shot, and for each one he developed the kind of optimum combination of motions and then set a circuit in the computer so that whenever they departed from that, they got a little electric shock. It was kind of like Pavlov's dog experiment, and with a couple of weeks' training, they could retain following the right pattern for another couple of weeks. So before going outside the country to an athletic meet, they could get trained. They could go, retain the benefit of the training for the two weeks they were there without the artificial assistance of the computer, and do very well and then come back and go back into training with the computer again. But anyhow, that's what his talk was about. So it was an interesting sidelight. I said I might get out into left field.

BERGEN: That's okay. We were talking about your consulting work. Did you do some consulting for the National Academy of Engineering?

PURSER: Yes. One of my Chamber of Commerce Science Committee contacts was vice president of ESSO, now Exxon, Production Research Company. He and I got along very well. Working for him, I helped the people at ESSO Production Research [EPR] who were designing the [Hondo] platform— ... it was to go off the California coast, and at that time was the deepest offshore platform in the world. It was 840 feet deep. He asked me to help his design people develop a design-review process for it, and I did. I had two [EPR] guys [to work with] on it. A lot of the basic information was very carefully guarded industry secrets, so I didn't get involved in any of the details, but I did get enough to be able lead them into setting up a design-review process similar to what we had done for spacecraft and spacecraft components here. They were very pleased with that.

The vice president of EPR, Dr. Claude Hocott, was a member of the Academy of Engineering and was a member of their Marine Board that was, at that time, trying to help the U.S. Geological Survey develop ways of overseeing the offshore oil and gas operations, and so he asked me to do some of his committee homework for him. He liked what I did and told the Marine Board committee that he had had me do it. So they offered to let me come work with them as a consultant.

At the same time, he felt that a retired Navy captain who had supervised diving and salvage for the Navy before he retired, that he and I would be compatible. So he introduced us to each other, and we are still close friends and worked together on many marine projects other than those we were on [with] the Marine Board ... for over twenty-five years now. So, living in town and doing some of the things Gilruth didn't want to do paid off for me in the long run. [Laughter]

BERGEN: Great. It's time for us to change our audio tape...

BERGEN: Let's go back to Mercury again. From our research, it looked like you were one of the first people that talked to the Mercury Seven astronauts when they first came to Langley. Do you remember that?

PURSER: After they were already selected and came to the Space Task Group at Langley, Gilruth had a group of us, he and Donlan and Faget and me, Chuck Mathews—I can't remember who else, but there were about seven or eight of us and the seven astronauts—sat around a big conference table and just spent about three hours, I guess, getting to know each other. It was nothing technical or business-like. It was just twelve to fourteen people who were going to be working together getting a chance to get on a first-name basis and find who had what little quirks, some of them.

BERGEN: Did you work directly with the astronauts a lot during Mercury?

PURSER: Very little. Gilruth and Chuck Mathews, Chris [Christopher C.] Kraft [Jr.], Walt Williams had come up in the Flight Research Division at Langley, and I came up in the wind tunnel area, and I didn't get involved in any flight work until we started flying rocket models. They didn't have pilots in them, so I didn't get imbued with the flight-test engineer background. So I was more or less a second-class citizen in dealing with the astronauts and so on, as was Faget because he hadn't come up through the flight-test regime either. So, most of the people who had real close daily working contact with the astronauts were people that were involved in Mission Control activities and had come up through aircraft flight-test work.

BERGEN: Do you have any special memories of any particular Mercury mission?

PURSER: Well, on two, when [M.] Scott Carpenter flew and landed a little bit off of the intended landing spot, there was a while when nobody knew exactly where he was. Walter Cronkite had been kind of bored with most of the flight, and when Scott Carpenter got lost, as I recall, Cronkite just blossomed out, "Wonderful! Now I've got something to talk about. They've lost this guy. Whew!" Those weren't his words, but that was my impression, which stuck with me a long time. I remember seeing Walter after [John H.] Glenn's [Jr.] recent flight on TV, and I thought about it then.

I didn't get along too well with some of the news people. One of the local stations, I don't remember which flight it was, seems to me it was one that landed in the Pacific. I don't think it was an Apollo flight, I think it was one of the later Mercury flights. Again, a spacecraft didn't land exactly where they hoped it would. One of the local TV reporters—

well, several of them, wanted to interview me. Everybody else was down at the Cape [Canaveral, Florida], and I was acting director, so that was it. They asked fairly reasonable and innocuous questions, and the next one came up, and I said, "Okay. What do you want to talk about?"

"Oh, the same thing the other guys have been asking."

I said, "Fine."

He said, "Now, my first question is, when did NASA institute this policy of hiding the landing spot of the astronaut from the press and not telling us where in hell he is?"

And I controlled myself; I didn't hit him. [Laughter] I said, "Sir, the interview is over. The surmise you have made is absolutely false, and, in addition, I don't appreciate your telling me that you were going to ask me the same type questions the others did and then try to slam me with a vicious rumor like that." So he shut up and left. And his boss at the station showed the whole thing, and he said, "Your complaint is now on file, Mr. Purser." [Laughter]

BERGEN: After Mercury, the next program that took place was Gemini. What was your involvement in the development of the Gemini Program?

PURSER: Really nothing specific that I can think of. It was just a continuation of helping take care of things for Dr. Gilruth. I think that for things like that, probably a review of the daily log bit would tell you much more than I can remember. Some things, like the Russian shot-putters—of course, that occurred after the end of the daily logs, but the encounter with the TV newsman and Walter Cronkite's remarks and so on wouldn't have been in the logs anyhow.

BERGEN: During our research we found that you kept a scrapbook for Dr. Gilruth of Russian progress in space. Is that accurate?

PURSER: I don't recall that I did. Whenever I saw anything that I felt he might have missed, I made sure that it got mentioned to him, either by copy of the clippings and so on, but I don't recall keeping a scrapbook for him.

BERGEN: Did you have very much knowledge of what the Russians, the Soviets, were doing during Mercury and Gemini especially?

PURSER: Not really, not anything more than what was in the papers, because, as I gathered, the U.S. was fairly open with its own press about what they knew about the Russians. They were not open about a lot of things that they were suspicious of, but I think that they were pretty open with the press about what they really knew.

BERGEN: You discussed moving from Virginia to Houston. What was the impact on NASA, making that separation?

PURSER: There were various impacts. One, we got less cooperation from the people at Langley when we were down here, mainly just because of the distance. You can just walk across the street to another building and go in and see Joe and say, "What's going on in this?" Just the lack of close contact. Other than that, there were very continuous friendly relations. There were a lot of personal impacts involved, people making a 1,500- to 2,000-mile move, completely different part of the country, different general attitude of the people.

For example, I was born and raised in Louisiana and went to work for NACA in Virginia, and some of the Virginians, who are very strong on being part of the first families

of Virginia and said something about when did I hear or say or do something. I said, "I guess it was shortly after I came up north here to Virginia."

"You can't come up north to Virginia. There is no place in the world further south than Virginia." [Laughter] So I learned that lesson.

Texas had a big Ford plant somewhere here, and one of the big ads at that time was "Built in Texas by Texans," and we had some display materials built in our shops here to take to some meeting, and down in the corner on one of the boxes was "Built in Texas by Virginians." [Laughter] We not only brought engineers and managers and so on down, but we brought an awful lot of very high-class technicians, and it's something that many people don't realize, that the technicians played a very vital role in making stuff work. But that was one effect of the move, just a change in the people that you deal with.

BERGEN: Speaking of people that you deal with, you worked closely with Dr. Gilruth for many years. Can you tell us about him?

PURSER: I stay in touch with him now. He doesn't know it, because he's suffering from Alzheimer's, but I stay in touch, at least a Christmas card and maybe one other exchange of notes with Mrs. Gilruth, and got one from him this Christmas. There's just no recollection of anything now. For a while he would remember spasmodically, but now, apparently, he's completely gone. But I felt very close to him, and I think he's really the best boss I've ever had, because I could be completely open with him about anything and felt he was being equally open with me. We got along very well.

BERGEN: That's important. It seems that you were describing your interview with a media person. How much involvement did you have in public relations for NASA?

PURSER: It depends on the point of view. From "Shorty" Powers' point of view and from his successor's point of view, I meddled in it too much, but we just had a little bit different way of looking at things, I guess. So we tried to leave most of it with the Public Affairs Office, because that was their job. But every office gets a little bit of meddling from the front office now and then. They just seemed to resent it more than anyone else did.

BERGEN: How well do you think NASA portrayed itself to the American public?

PURSER: I'm not sure what it is that you're really asking.

BERGEN: Do you think NASA did a good job of presenting itself in public relations?

PURSER: Yes, I think it did. The kind of places where we had problems was the public affairs people were somewhat horrified by me telling this TV interviewer that he had just finished his interview because, one, he didn't talk about what he said he wanted to talk about and tried to pull this other thing on me. "You just don't tell him that. You just change the subject."

"I didn't feel like changing the subject."

And the press were not allowed in the Control Center during a mission, and, so far as I know, they still don't get on the Control Center floor, but sometimes one or two can go into the viewing balcony. But it was a long time before we would even let them get into the viewing balcony, and the press and the public affairs people, after "Shorty" Powers left, couldn't understand that, and this was largely during a period of time when there was one particular reporter on the *Chronicle* whose greatest delight was finding something that he could show as a horrible example.

The first one was we had spent something like \$20,000 on three big flag poles in front of Building 1. He made a big deal about that. One of the contracts for crew equipment had been to get a pen that would write in the absence of gravity, and he tried to make a big deal about that. The people on the floor of the control room wanted to concentrate on controlling the flight. They didn't want to have to stop and think, "Well, now, what if I scratch? What's the damned reporter up there going to say? If I move my earpiece, what's he going to say?" We didn't want to bother with things like that.

I remember one of the more friendly reporters was from the *Post*, and he went around public affairs and came up and talked to me. It was while George [M.] Low was deputy director, and I don't know whether George called us both into his office or whether I took the guy into the office. George, I think, was able to get across to the guy what the problem was and get him to understand that we weren't just playing high and mighty, you can't mess in our business, we were trying to protect the people's ability to do their business. I think that got it across to him. George was another one of the best bosses. He and Gilruth were very much alike in terms of how they dealt with people, in addition to being a very smart guy, too.

BERGEN: One thing we haven't talked much about is Apollo specifically. Do you have any special memories or anything that stands out in your mind from the Apollo Program?

PURSER: No, not really, because by that time almost all of the engineering and technical problems were being handled by the engineers who were actually doing the work. My position in the front office was more managerial and people contact than it was technical by that time. So I really can't think of any technical input that I had in either Gemini or Apollo. There again, in the daily logs you might discover something.

BERGEN: How did the Apollo 1 fire affect your job, affect you in your job?

PURSER: Gilruth wanted me to collect all the information on it, but then when he told Joe [Joseph F.] Shea about it, [Joe] insisted that—I believe it was Tom [J. Thomas] Markley in his office be the central point for collecting all the data, which suited me fine. I think Joe just wanted to be sure that there was someone he could trust doing it, and Tom Markley was a very trustworthy guy.

BERGEN: This year will mark the thirtieth anniversary of Apollo 11 landing on the Moon. Do you remember where you were when that happened?

PURSER: No, I don't. [Laughter] I was just being busy.

BERGEN: Looking back over your career at NASA, what do you think was your greatest accomplishment?

PURSER: Surviving. [Laughter]

BERGEN: Well, that's important.

PURSER: It was such a great time, and I was always allowed to go meddle in other things. No one ever sat me down at a desk and said, "Now, you work on this, and you stay in that square." I could inquire about, sometimes work on, anything I wanted to, and as a result, I very rapidly got to know a lot about the whole organization.

In fact, in the very early days of World War II, there was a question about why were these people at NACA getting draft deferments, and the War Manpower Commission came down to Langley to make a study based on what if we did not give these people draft

deferments, if we drafted them, how long would it take to replace them so that what the Air Corps and Navy felt were vital research activities could continue.

Well, by that time, I'd been at Langley, I guess, three years. I was enough acquainted with the people around the labs that they plucked me out and said, "You head up the study for the War Manpower Commission." So with about three or four other people from different parts of the lab, we went through every technician and engineering—well, effectively every male job in the Center, and using a *Dictionary of Occupational Titles*, classified them, maybe not in the same words that were used normally for a wind tunnel mechanic, but it was Instrument Technician Five, whatever it was out of the *Dictionary of Occupational Titles*, and every male job in the Center, we made an estimate of what it would take to train a high school graduate to be ready to take on such a job.

The result of it was that all of us who were draft-eligible were drafted and assigned to the Air Corps inactive reserve for as long as the war lasted or as long as we continued to work for NACA. So my active duty time was about five seconds, because the man said, "You are hereby inducted into the Armed Forces of the United States of America and assigned to the Air Corps Enlisted Reserve [on inactive status]." Since they don't measure active duty status in units smaller than a month, I don't have any. [Laughter] That was, to me, one of the greatest things about NACA and NASA, is that I just wasn't limited. I could get involved in almost anything that I wanted to.

BERGEN: Through your career you saw the birth of the Space Age. What's your perspective now of what's going on with NASA and the future of space?

PURSER: Well, there are two things that concern me. One is the general political atmosphere that politics enters into decisions seemingly much more strongly than real needs or engineering and science facts call for. The other thing was something that I alluded to, Dr.

Dryden not being personally in favor of NACA becoming NASA, but having been convinced by the people in the Research Centers that that was the best thing for the country. So he worked and made it come about.

There has been a continual decline since then in people from headquarters taking advice from the people who are doing the work. That won't keep it from getting done. Somehow it will get done, but it's going to be delayed, there will be a lot of lost motion, and it just won't go as smoothly as it could. It'll cost more and take longer and make a lot of people unhappy.

I think that going on with the Space Station now is good; it's just late. It could have been done many years ago, or we could have just gone almost straight into the Space Station preparations based on the combination of Skylab and the Shuttle many years ago, and now we're still arguing should we go on with it, which I think is just absolutely silly. Of course we should go on with it. Some of the other things that have come about because of the delays I think have been great. The little Sojourner on Mars, whoever came up with that, it was a fantastic idea, I mean [it was an amazing little robot]. I think that those kinds of things are the things that come up out of the lower ranks. They don't get thought up by the administrator or his immediate staff.

BERGEN: Before we close, I'd like to ask Sasha and Carol if they have any questions. Sasha?

TARRANT: Yes, I do, a couple, actually. In looking at your career, it seems that an important part of what you contributed to NASA and the great accomplishment was your ability to pull people together. I think probably the best example I saw was your ability to pull Houston and Huntsville together and make them work as a team and see the other perspective. Could you discuss that a little bit, tell us about your mediation, I guess, between the two groups and getting them to pull together as a team?

PURSER: Yes. I think part of it comes from the fact that I've enjoyed so much being able to get involved in all aspects of the problem to some extent. That [gave] me an understanding that you don't get anywhere by fighting. You get somewhere by working together. So, instead of going around picking fights with people, I try to get them to work together.

We had one assistant director at Langley that used the confrontational technique whenever he wanted some information, and finally I got tired of it. He was two or three grades higher than I was, but I told him, "Buss [nickname was Buster, often shortened to Buss], I'm not going to tell you one damned thing if you want to start a fight about it. If you want to know something, ask me the question, and I will be glad to tell you everything I know, but I'm not going to fight with you about it one minute. So come back when you don't feel like fighting." And he hasn't tried to fight with me since then, but he has asked me many times what I thought about something. I think that that is maybe why I've been able to help pull people together and get them to work together, like getting the four universities to agree to accept each other's credits, with adequate safeguards to the faculty's sensibilities, of course.

TARRANT: I was also curious. You mentioned earlier that you were on leave for a year and went over to the University of Houston as a special assistant to help set up a campus here at Clear Lake. You seem to be in a unique position to comment on the formation of that school from both the NASA perspective, what NASA wanted, why they might want to have a school nearby, and then what the University of Houston saw in building a school here.

PURSER: Well, we always had the problem of trying to learn new things and new techniques, trying to upgrade our people so that they could more quickly adapt to new things. So from the earliest days of NACA's growth from 700 to 8,500 during World War II, we've had

special classes, many of them taught—handled by universities, even though the universities would take advanced people from within the lab to do the teaching, but they still would kind of approve the course plans and so on. So this is just an extension of that when we got down here. It was a so much bigger thing that we really couldn't spare the space for it to be held in various conference rooms around the Center, and we had all of the petrochemical industry fixing to explode around us—not literally explode, but emerging industry, shall we say.

All the school districts, their faculty needed a convenient place for advanced education. So the University of Houston thought, since they had been cooperating with us all along, that maybe the thing to do was to try to get something set up out here, and they got hold of one of the companies—I think it was Lockheed—that owned the land, and they talked Lockheed into donating the land, and the university would take on the job of getting the Center developed. Because the academic contact was one of the things that I had already been doing, they asked if they could borrow me for a year, and Gilruth said okay. When I got ready to come back, I went to the hospital instead.

BERGEN: Carol?

BUTLER: I just have one question. You mentioned earlier that President Kennedy's announcement for Apollo to send a man to the Moon and return him safely by the end of the decade—how did that impact you? What did you think when you heard that?

PURSER: I think it was kind of a mixture of, "Gee, we finally got somebody's attention in a way different than 'Gee whiz,'" and, having gotten their attention, "Good God, what do we do now?" We sit down and get busy and hope that the instructions to go to the Moon get followed by "Here's the money to do it with." [Laughter]

BUTLER: That's all the questions I had. Thank you.

BERGEN: Thank you so much for coming today and sharing your stories with us. We really enjoyed it.

PURSER: You're quite welcome. I enjoyed it.

[End of interview]