NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT
EDITED ORAL HISTORY TRANSCRIPT

JOHN H. BOYNTON
INTERVIEWED BY REBECCA WRIGHT
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WRIGHT: Today is March 6, 2009. This oral history interview with John Boynton is being conducted for the Johnson Space Center Oral History Project in Houston, Texas. Interviewer is Rebecca Wright, assisted by Jennifer Ross-Nazzal. Thanks again for coming in to talk with us today. We know that you were involved during the very early days of space exploration. Please start by telling us how your interest first began.

BOYNTON: Did you read the book *Flight* by Chris [Christopher C.] Kraft? Actually, that's an enormously important book because in there he talks about how lucky it was that he made a decision to come back to NASA and consider their job offer, although he was being interviewed by Chance Vought. In the book he says that he didn't bring his birth certificate, so he couldn't get a clearance and thus couldn't start his job. He got tired of waiting for it to be delivered and got back on the train and went to Langley [Research Center, Hampton, Virginia].

So, in that vein, I want to tell a little story about myself. I grew up during World War II, and I was a young boy when the war was going on. I immediately was attracted to the romance of fast fighter airplanes. Obviously, I know now as a grown person that it was a terrible war, and a lot of good people died, and that was truly tragic, but as a five- to nine-year-old boy, I was certain I'd grow up and design sleek airplanes that would go and kill those cruel Germans. In actual fact, I wanted to be a fighter pilot. That's what got me interested in aviation, World War II. But my father was also a pilot of note. He actually set a junior transcontinental flight speed record when

he was only 18. He decided to rent an airplane, an early Cessna, and fly it from Rockland, Maine, which is where I grew up, to Long Beach, California, and back. They didn't have navigation aids in those days. You had to fly along railroad tracks or down beside a water tower, for instance, and reading the letters thereon, say, "Okay, this is Hope, Arkansas." So he made it across the United States without killing himself and then, with the wind behind him, made it back, setting a record each way, east and west. He was, of course, a local hero. In my little hometown of Rockland, Maine, there's a municipal building, and he's on this Wall of Fame with several people from the Rockland area who achieved some kind of fame—senators, governors, sea captains and others like that. My father's there in all his youthful glory.

Unfortunately, I did not grow up with him. I was a victim of divorce, like far too many others today, but certainly in that time period, there weren't that many who divorced. When I was a kid, divorce was a stigma. a bad thing. But my dad went off and remarried and had two daughters from his second marriage—and I know both ladies now very well—but unfortunately growing up I didn't know either them or him.

Yet I obviously inherited his love for aviation, because we were both fascinated by airplanes, and I want to tell just a little bit about what he did. He set that record and became a junior Lindbergh. Everyone in New England, at least, in the Boston/Maine area, thought he was just another personification of Charles Lindbergh. He was a very mechanically-oriented person, and I certainly inherited all of that; I've always been drawn to mechanical things. He set up a flying service to the islands off the coast of Maine—a state that has numerous small islands and a few large ones, and a lot of rich people in those days had cozy summer cottages on some of those islands. He flew people back and forth from Rockland to their place on the island. Unfortunately, one of his pilots had some kind of a medical emergency and crashed his airplane

right into Rockland harbor. Well, in those days, one didn't have insurance, so he basically lost his business with that one crash. The guy that the float plane was ferrying, and the passenger also got killed.

My dad then applied to fly for Pan American [World Airways]. In those days, the airlines had just started—this was now in the early 1930s. So in the mid-thirties, probably right around the time I was born—I was the second child; my sister was a year older—he went to Florida and flew those gigantic Boeing Clipper ships for Pan American, those big, beautiful airplanes that landed on the water. I forget how many people they held, but it was probably close to 200 people, which in those days was a huge airplane. It was the 747 of the thirties. Actually, they were wonderful airplanes; they were very efficient, very stable, and very well-designed. He flew from Miami to Havana. Well, that's such a short distance, maybe a 120 miles. Obviously they used those airplanes because they carried a lot of people but was capable of landing on the ocean in the event of engine trouble. He flew down there for two or three years, and as soon as he came back, my parents got a divorce. I was two years old when they split up and went their separate ways. I wish I had known the guy, because I think he would have been fascinating to talk to, especially about airplanes. After a while, he gave up aviation altogether and first repaired and then became a salesman for Mack Trucks.

Now, I remember he came to see me on my 14th birthday. He came through town quite a bit because his sales route took him through Rockland. He was living down near Portland, Maine, and would come through town, but wouldn't bother to stop by and see me. But on my 14th birthday, the local paper, the ***Courier Gazette***, ran an article and showed me holding one of my model airplanes, and it said, "Local Boy Follows in Father's Footsteps." It talked about how I had built model airplanes and were flying them. I really liked that article. It said I was going to

go on and be in aeronautics somehow. He came by the house—I do remember that—heck, he recalled it was my 14th birthday. I still have the picture from the paper. So at least he cared enough, at least that time. But I didn't know the guy.

Well, I went to MIT [Massachusetts Institute of Technology, Cambridge, Massachusetts] because I got a trust fund from a rich uncle, an inventor who I never knew, who came up with the money to get me a college education. I had to go down and interview with these stoical Boston lawyers, and they were—they were the epitome of the successful Boston lawyers. Harry Anderson and, get this, Lucius B. Thayer—from the Hale and Dorr Law Firm—in a dark mahogany-paneled office on Boston's famous State Street. My father took me down there, and we sat there stiffly. They broke silence by asking, "Son, what do you want to do?" and I said, "I want to be an aeronautical engineer." They came back with, "Well, I guess you'll probably go to MIT." I remember I said something really stupid like, "What is MIT?" or "***Where*** is MIT?" A young kid in a small high school in Maine can't be expected to know delicate things like where MIT was. But I did go there and I even graduated with a degree in, are you ready? aeronautical engineering. At the time I was in school, the terms aerospace engineer and rocket scientist had not been coined. And let me be clear, I'm not here to tell you what a great intellect I am. I wasn't then and I'm not now. Sure, I went to that engineering factory called MIT, but I had to work my tail off, and that's exactly how I got through. There were some truly brilliant people at MIT, and I wasn't one of them.

But at the time that I went through MIT, from '54 to '58, we were in between wars and the government was not drafting many people. They still had the draft, but very few guys were going into the service. I wanted to go out and design airplanes. Well, two things happened to keep me from doing that. Again, this relates to why I got to work on Apollo.

By the way, I have to say this. I'm going to be a generalist through this whole thing. I'm a person that's interested in learning and doing just about everything. I've even told people I would bear a child if it were biologically possible. If men could have babies, I would go through that, and I'm dead serious about it. I think on this planet, I want to get to do everything, and I hope that comes through in the interview, that I love to learn about everything. So I wanted, as an enlightened generalist, to design airplanes; I wanted to know a little bit about everything is crammed inside of or hangs off of truly functional airplanes.

When I got my bachelor's degree at MIT, the aircraft industry wasn't hiring. We were in a recession, and it was really hard to get a job. I remember I applied to Lockheed [Martin Corporation]. You know, that's where [Clarence] Kelly Johnson and "Skunk Works" were located—those famous people that brought you the U-2, the P-80/T-33 Shooting Star, and the sexy, hypersonic SR-71 Blackbird. That would have been fascinating to me, if I'd worked under him.

I sent them an application and a resume, and they turned me down. This was after my master's degree in aero from Cornell [University, Ithaca, New York]. They turned me down, and I immediately called the personnel guy back, demanding, "Why are you turning me down? I've got a master's degree in high-speed aerodynamics and that's what you guys do. You're doing ICBM [intercontinental ballistic missile] warhead reentry vehicles; you're doing hypersonic recon aircraft," and he interrupted me, saying "John, we just don't have the spaces. They haven't given us the money to buy people. Things are tight right now." He said, "It has nothing to do with your background at all." So I was entering the working world in kind of a bad time.

The second thing that was unfortunate is the high-speed analog computer came along, and anybody that was trying to design efficient airplanes, at least for the government, were able to feed certain data into a gigantic vacuum-tube computer, and what would come out was pretty much

what the airplane was supposed to look like. The wing span, the wing area, the tail moment, even the final weight, you know, nearly all of the physical features of an airplane. They no longer had guys who sat down at a huge drafting board and drew the side view—they called it inboard profile of the airplane—and just how it was going to look and how it was going to work. That's what I wanted to do. They had fancy computers doing the very kind of thing that I was hoping to do. So I had to go into something very specific, like in this case, high-speed aerodynamics. I didn't want to be a specialist, I really didn't.

Well, as fate would have it—and we're back to the example of Chris Kraft having his fateful, unusual happenstance—I got a job with General Dynamics, working in their aerophysics group. I was married and had two little girls then—not the thing a young engineer just starting out should do in those days, but I never claimed I had perfect judgment. So they gave me a very good job, a very good offer. My home had always been in Maine, and I drove diagonally, all the way across the country to San Diego to take that job. It took me a week, and again, with this wife of only 20 years old, or 21, something like that—young. We were both young people with two daughters under three years old.

I got out to General Dynamics, and I found a place to stay—a motel that rented by the week. I went in to report for my job, and they said, "John, we're really sorry, but we gave out so many offers in aerophysics, we got a higher rate of acceptance to those positions than we expected, and we just filled up quickly. We tried to contact you. If you want to go apply somewhere else because you didn't get this job, we'll understand." I said, "No, this town and this company is where I want to work." I said, "Just give me another offer." So they gave me an offer of three different jobs: structural design, and systems analysis, and then a third one, which, for some reason, I've never remembered, but I know it was something I didn't like. Structures, to me, is like being

an accountant—an engineering accountant—continuous number crunching, and I hated that. I might kill myself if someone said, "You have to do accounting, or structural design, for the rest of your life."

So I said, "Okay, what's systems analysis?" They said, "Actually, we talked about this before we talked to you about this job. Management sat down and said, 'Should we offer him this job?' because usually, when someone goes into systems analysis, they should have quite a bit of broad experience, particularly in the way the company does things. This department requires someone to have full knowledge in the area of systems integration, as well as of how the company handled strategic design. But we saw that you had a pretty broad background, and you're a smart kid, so we're going to offer you that. But you may have some trouble with it because you simply don't have the background. It's going to take you get six months to get your feet on the ground." Anyway, I was lucky, very lucky.

In systems analysis, [you are] in the department with preliminary design; the preliminary design part of systems analysis that did all of the proposal and bidding the company. Anytime they had a new contract that they were trying to get, these people churned out the bid, and they borrowed design engineers as they needed to. Then the operations analysis people did the complex studies. They tried to find out, where can we go to the government, primarily the military, and say, "Look, you need one of these," or "You need two of these," or "You need a weapons system that can do this"—and they would lobby for a new contract. We did the long-range stuff. I don't know if you've heard the term "operations research," but [Robert S.] McNamara and his intellectual people at the Rand Corporation started that mentality.

I got into a group in which I had no idea what I was doing, and like the guy said, I had to spend almost six months just to get my feet on the ground and figure out what they were doing.

But it was fascinating; it was interesting. The only thing that I remember I did in the period before I was assigned to Apollo was I did what's called an ICBM error study. They wanted to statistically quantify the development of the accuracy of the Atlas [rocket booster], and they had already flown dozens of them. I think they flew almost 50 Atlases during the development phase. When the thing actually was launched, and they let the warhead go, and it landed somewhere, they always had a target point. Then I had to figure out, statistically how close was it to the planned target. I learned to use a term called CEP, circular error probability. That was an interesting study, so that took me about six months to go through all the film and all the data.

As soon as I finished that study—General Dynamics was one of three companies that was awarded a study contract by NASA to look at the feasibility of landing a man on the moon. By the way, NASA had just been formed then—in '58, and this was in '59 or early '60—to look at a manned lunar landing program, because a visionary named [President] Jack [John F.] Kennedy had gotten to the White House and right-off-the-bat said, "Why don't we do this? Why don't we leapfrog the Russians and see if we can send an American to the moon?" No one would have ever predicted that we could do that or even that we would get the money to do that because the risk was so great. It was just a rumor that maybe NASA wanted to do something like this. NASA in its great wisdom—and I'm glad they did this—said, "Well, we have no idea how we would do it. We don't even know if it's possible. We don't even know if we have the technology, so we're going to go out to three big companies and let them work on it." They gave a small study contract—it was a six-month contract of not a lot of money—I forget how much, but it was less than a million dollars. It wasn't big money.

General Dynamics' management sat around, and they said, "There's no way NASA is ever going to get the money to fund a huge program like this, and even if they do, there's no way we

can land on the moon now. We have to see too much of a technology jump to do it with a reasonable probability of mission success. So we're going to assign all our neophyte people, our new guys, the guys that don't have a lot of experience, to this [study] because we can't afford to take our experienced guys and put them on it."

Bill [William F.] Rector was the project study manager, and he was a young guy—he was only a couple of years older than me—and he was given a handful of people that he could select. I remember I went in and talked to Bill, and he said, "What do you do?" I said, "I'm interested in everything," and he said, "Okay, I got a great job for you. There's one job where we want someone to do all the non-technical-design stuff." This is what's really funny. Here I am, two degrees in engineering, and I did all the non-engineering stuff for the study: the reliability plan, the test plan, the manufacturing plan, the scientific plan, the budget, you name it. I had no idea what I was doing. But I got assigned to this group, and I'm thinking we only had like a dozen or a dozen and a half, maybe even two dozen, people working on it, which is not a lot.

A couple of months into the study, and it could be even as late as three months into a six-month study, their corporate spies in Washington, DC, found out that this program is really something that's going to happen. They weren't sure that it would go to completion—that we would get so far down the road and then we would definitely land on the moon—but they knew that NASA was going to get the money to look at it and maybe build a spacecraft. So they suddenly added a whole bunch of experienced people to the study so that we could do a really good job. I was leading eight or ten people—they temporarily worked under me—people that had been working a lot longer at what they did than I had. I had only been there a year or so. But fortunately the guys that were assigned to me didn't mind the fact that I was this young kid right out of school and green behind the ears. We got a good job done; we turned out a really

good study. I had gone back to Langley at least twice to give presentations on our progress, and we had to do our final pitch on what we came up with. So I am, at Langley, giving this talk, and I'm only 24 years old, that was in 1960, which is pretty young. I was in on the ground floor pitching proposals to NASA that were foreign to me a year earlier.

I was so lucky that I didn't get into aerophysics, and I was so lucky that I didn't take the job at Lockheed. I would never have worked on Apollo if I hadn't gone the path that I did. So here I am on this Apollo study, and I do all of the non-engineering stuff. We turned out a study that I think it was as good or maybe better than the other two companies. It was certainly as good as Martin Marietta's. But we knew that we had an inside track to get the hardware contract. I mean, this was a big, lucrative contract award, to build the Apollo spacecraft.

As soon as the study was over, and we gave our presentation, we went back and worked our tail off. We knew the hardware request for proposal [RFP] was coming down the pipe—and we knew that was going to show up about three, maybe four months after the study was complete. So we started working on it immediately because General Dynamics management really wanted to get that prestigious spacecraft hardware contract. We teamed up with AVCO Corporation [Boston, Massachusetts]; they were the people who had done almost all of the design work for ICBM reentry vehicles up to that point. They were pioneers in reentry technology, and they were very good, very good. So we teamed up with them, and we thought that would help us, because obviously DoD [Department of Defense] knew precisely how good they were.

We put together our hardware proposal, and it was a very good one. I worked my butt off on that. I got to do a little bit of engineering stuff, but mostly what I did for the hardware proposal was what I did in the study. The most important input I had was the test plan. This plan told how we would develop the spacecraft, test all systems inflight and finally land two guys on the

moon. By that time, the RFP said, "We want to see if you can build a spacecraft that will do this within the decade"—of the sixties. We went back and made our case to Langley and basically said, "Give us the contract. We are the guys that usually do this sort of thing. We know what we're doing." I think they had eight or nine bidders. I tell this story because it's so interesting.

North American [Aviation Corporation, Downy, California] was asked to make a bid only because they were well-known to NASA. They were invited to bid as a courtesy. They already had like four or five big contracts with them, including—we knew then, they were going to build the Saturn [booster] S-II stage, I think, and [North American Aviation] Rocketdyne, their rocket division, was building all of the nozzles, the rocket engines, so they had huge contracts already that related to Apollo, and they had a whole bunch of DoD contracts, plus the X-15. So we said, "They're [North American] not going to get it. Congress likes to spread the wealth; and Los Angeles already has lots of aerospace business. North American doesn't stand a chance."

I remember the day that they were awarded the contract. I had been to the dentist, and when I came back to work, the guy who was the project leader on the proposal phase was leaving work, and he said, "You heard about North American? They got the contract." I couldn't believe it, that General Dynamics did not get the contract to design and build the Apollo spacecraft. We had submitted such a strong hardware proposal and had the design-intensive study experience to boot, which NAA did not. I had just experienced a root canal and this revelation hurt more. I really thought if we did not get it, that it would be General Electric or Martin Marietta, the other two study contractors.

Bill Rector and I got in his car the next day, and we drove to LA [Los Angeles, California] and interviewed with North American to see whether we could get a decent job with them. We didn't, as luck would have it. We both came back, applied at NASA, and we both came to

Houston to work for Space Task Group, soon to be the Manned Spacecraft Center [MSC].

That brings you up to how I happened to be on the ground floor of the Apollo program. At the time that the most number of people were working on the lunar landing program—that includes Gemini and Apollo, and even Mercury --which was all over, but in the mid-sixties, around ’65, ’66, the number was bandied about that half a million people were working indirectly or directly on Apollo. That may be a modest exaggeration, but certainly hundreds of thousands of people at one time were working their little tails off trying to land two Americans on the moon. I was among a couple of hundred people that worked on Apollo at the very beginning, during the study phase. I was lucky. I was ***really*** lucky to be among those first 200 people—and that includes only about 35 or 40 in the Space Task Group at Langley [Air Force Base, Virginia.] that were NASA people. Nobody else was working on Apollo, by the way, except the Space Task Group and the three study contractors. I was lucky that I got involved that early, because I had so little industry experience.

The reason I say that is I want to talk as much as I can in our interviews about the feelings that were generated working on Apollo, and the sense of pride, and the things that most engineers don’t usually talk about. I say this now because, can you imagine how I felt when Neil [A. Armstrong] got out of the Lunar Module, stepped down that flimsy, too-short ladder on one leg of the LM [Lunar Module] and hopped the last three feet to the lunar soil? It was frankly surreal, as I sat there in the darkness of the MSC auditorium and watched the TV feed from the moon. That "small step" for Neil, his "giant leap for mankind," was the culmination of ten years of my work and of course thousands of others who came on board later. Again, I’m not trying to tell anybody that I was the most important person working on Apollo, but at least I was one of the people who worked on it the longest. If you want a good example for the definition of the word surreal, that

black-and-white TV image of Neil on the ladder was surreal, because a ten-year dream was actually happening.

WRIGHT: Tell us about that transition after you left General Dynamics and came to work as a civil servant for MSC in Houston.

BOYNTON: Well, when I sent in my form-52 [GSA SF52], which is that application for government employment. I put on there and made it really clear that I wanted to get into mission planning for Apollo, because that was the most interesting thing I had just done at General Dynamics. I had never been a mission planner before, so my experience for the Apollo study was the only familiarity I had in doing mission planning for anything. But I loved doing it, because you had to have such a broad knowledge of systems operation, crew participation, and manufacturing scheduling, all within budgetary constraints. I told the people that I talked to over the phone, when they invited me to send in my form 52, "I really would like to do Apollo mission planning." I knew they needed people. They were just starting up the Apollo [Spacecraft] Program Office [ASPO]—and that's where Bill was going to go, Bill Rector. I wanted to go with him and a couple of guys that were in his study group that were also going to go to Houston. Fred Peters and Harry Byington were two of them.

I really thought I was going to get a job doing that, but a guy named Joe [Joseph V.] Piland called me. He said, "John, we've approved you for a job. We've got a position, and it's X number of dollars, but we want you to work in Mercury." I said, "But I'd prefer NOT to work in Mercury." I knew what Mercury was, but I knew almost nothing about the spacecraft. I knew about the Mercury booster, because it was the Atlas ICBM built by good old General Dynamics in

San Diego. I had seen their assembly lines. But Mercury no longer had any real romance or luster, since [John H.] Glenn had just achieved the main goal, weightlessness in Earth orbit. I knew the U.S. could now put people in orbit, and [Russian Cosmonaut] Yuri Gagarin had already flown, so it wasn't like we were first in earth-orbit technology.

I didn't want to do that, and I said to Joe, "Why do you want me in Mercury? I've got all this wonderful Apollo experience. I'm one of the people you should really want in Apollo." He said, "Well, I'm going to be honest with you, John. Most engineers can't write worth a damn, and we have a guy that's now doing the Mercury technical reports. His name is "Mac" [Edison M.] Fields, and he truly hates the job. He's not really a particularly good writer, but he's somehow bullying his way through, and he told me, 'Find someone to take over this job. I can't do it anymore.' We noticed in your resume that you had done quite a bit of writing. We know that you're not afraid of it, anyway. We want you to come and do the post-flight engineering reports." Well, that actually changed my mind, because that would be a huge amount of responsibility. Of course, I knew almost nothing about the internal systems in the Mercury capsule, but I could learn real fast. I knew how it flew, and I knew basically what it did, but certainly not all of the details that you'd need to know to do is postflight analysis and reporting—so it was a huge learning situation for me. But then my long-time "generalist" objectives came back into focus, since I had wanted, in college, so badly to be an airplane designer, which requires broad engineering knowledge. This postflight reporting assignment required the very same breadth of knowledge, and I would learn it pronto. So I took it because it was like designing but gave me a lot of responsibility.

I was hired in as a GS-13, and in those days, it was really hard to get a 13 or a 14, because that was the upper part of the pay scale. If you were going to get anything over a GS-15, you had

to get Congressional approval. So GS-15 was the highest you could go, and I was offered a 13, and not the first step of a 13 either. But somewhere deep into the pay scale of a 13. So it was $800 and some—$887 a month if my memory serves me—which in those days [1962] was really good pay. So the pay, it turned out, the offer that NASA gave me was within a few dollars a month of what North American had also offered me. North American eventually gave both Bill Rector and me an offer, and we both opted to come to NASA, because each of us would have more responsibility. Bill would have gone up there to Downy and been a nobody, and I would have been just another engineer in a huge partitioned office area, digging deep into the bowels of Apollo spacecraft. But I would also have been a nobody, because they staffed up by the thousands in those first few months. So we both came to NASA, and the reason I worked on Mercury was because of my ability to write.

I'm going to mention modestly one thing. I had done a good bit of writing. I had written some articles for model-airplane magazines. This is really funny. Edna St. Vincent Millay is a lady poet and was quite famous back in the twenties. She lived on the coast of Maine in a little town called Camden, which is right near Rockland, where I grew up. By the way, if you ever get to Maine, go to Camden. It's one of the most beautiful spots in the world—truly, in the whole world. But they had an Edna St. Vincent Millay essay contest when I was a senior in high school, and I entered it. I remember having all these books spread out in front of me, the biographies and all that, and what she had done, and her poetry—she was a tremendous poet—so I wrote a nice essay. The first prize was a scholarship—this is what's really funny—a $25 scholarship. Today, that wouldn't even buy a textbook. But in my senior year in high school, 1954, I won the Edna St. Vincent Millay contest. And 25 dollars was a nice piece of change for a high school kid.

So I came to work in Mercury. I couldn't hire in at Houston because they had no Texas

facilities then—they were renting places all over the southeast part of town—and they didn't have any of their administrative offices down here yet. I actually traveled with my wife and now three girls all the way across the country again to Newport News, Virginia [where NASA Langley is located]. What a long trip that was. The kids were now old enough that they were yelling and screaming and pleading, "When are we going to get there?"—you know, that age. I was just going nuts. But we did wind up in Newport News, and I reported for work. I really didn't do much for a couple of months, because most of the Mercury people had already moved down here, but I had to go through the orientation business. I was up there reading a lot of manuals and meeting people but not much else until they sent me to the Cape [Canaveral, Florida]. I actually worked on Mercury-Atlas 7, MA-7, which was [M. Scott] Carpenter's flight. The good news was that Carpenter's flight was just a repeat of Glenn's, so I didn't have to learn anything more than whatever I had already read on Glenn's flight. I went to the Cape with Mac Fields, and we were like co–senior editors. He was the senior editor of the post-launch report, and I was his co-editor. We worked side-by-side, and I quickly figured out what he did and how he got the write-ups from the various hardware engineers and put flight results into a concise technical report.

By the way, the post-flight memorandum report had to be out in a couple of weeks, and it's a very thick report. It was the inputs from all of the systems specialists. Plus the pilot, or more popular term, astronaut, had to write a pilot's report, plus the operations people, plus the medical people—in other words everything that happened on the flight, and we had to get it out in a couple of weeks. I forget what the deadline was, but it certainly was in the order of that, two or three weeks. We also had to come up with little summary reports. They had a three- and a five-day report for management answer the question, "What really happened? Tell us." Mac showed me how we did the three- and the five-day summary reports, the preliminary report to NASA

Headquarters, and then how we turned out this huge, thick post-flight memorandum document.

Bill [William M.] Bland [Jr.] and Kenny [Kenneth S.] Kleinknecht were asked by Headquarters to give an MA-7 industry conference. They had already had a conference with Glenn's flight, MA-6, and they decided to have an industry conference after every flight, so after MA-7, we had a conference at the Rice Hotel in Houston. I was the conference chairman, the guy that it got it going and got the meeting place. I had to set up the conference, write the systems paper in what we call the public release document, the blue cover. I had to write this systems report, and then I had to give a paper. I had to give the presentation. I was beside myself.

This was all after that post-flight memorandum report that was issued at the Cape. I had a couple weeks or three weeks to do the conference, and I was beside myself, but I did get it done. It turns out we didn't do one for MA-8—I want to make that comment right now—and we did a summary conference for MA-9, which was the last flight of Mercury. The thing that I'm most proud of, if anybody wants to dig into 'what did this guy do?' I did the Mercury summary report.

In MA-9, Congress said, "This is our last flight; we don't need to fly Mercury anymore." The thick MA-9 public release document [blue cover report] was a summary of everything we'd done in Mercury. We had the two sub-orbital [Mercury-Redstone] flights with [Alan B.] Shepard [Jr.] and [Virgil I. "Gus"] Grissom, and Glenn and Carpenter [3-orbit Mercury-Atlas flights], and then [Walter M.] Schirra and [L. Gordon] Cooper flew the last two Mercury-Atlas flights. All were very successful flights, save for Carpenter landing far downrange.

The summary conference was all about what they had done and what did we learn from Mercury. I had to do the engineering editing of the report, and each technical specialist that turned in a separate input for their systems, like the environmental control system and the operations people, they didn't just talk about MA-9, they talked about everything they had done throughout

Mercury [1961-1963]. So truly, these were summary papers. I had to edit that, I had to write the systems-performance paper, and I was conference chairman again, so I had to do all of that after Mercury flights ended. But I am really proud of that document, because we had to send it to Washington to get it printed, and it had to first be reviewed by headquarters, so we had really tight deadlines.

I wanted to tell some things that maybe you wouldn't get from other people as I have some knowledge that other people don't have, and since this is long after the missions, I think I can tell a couple of secrets. NASA had always been paranoid about the tax-paying public finding out we were making mistakes, and that they might lobby their congressmen to cancel the program. There was a paranoia that went all the way through all levels of management at NASA, where the mentality was, "Don't let the public know what we're doing when we screw up, because we know we're headed in the right direction, we know we're going to be fine, but the public will start screaming, 'Don't fund this debacle any longer.'" So there was a paranoia about, "don't let anybody know we screwed up."

Now, I want to tell a story about Scott Carpenter. I knew the original seven guys very well—very, very well, and Scott was a guy that tried hard to give the impression he was a scientist. I don't know whether he was trying to set himself aside from the typical test-pilot mystique or the test-pilot stereotype—that he was more intelligent than that—I think that was part of it. He didn't want you to think he was one of these jocks that just bored holes in the sky with fast airplanes. But, when he flew his flight, MA-7, they didn't have any mission objectives that really extended anything Glenn had done other than they had some added scientific objectives, modest ones.

By the way, one of my jobs was not only to do the post-flight reports, but I wrote the mission objectives for all flights after Glenn's [MA-7, MA-8 and MA-9]. That's how I got to

know [Eugene F.] Kranz. I had to go down to his flight control shop and get his help. But I wrote the mission objectives, and MA-7 had some scientific objectives that were questions raised during Glenn's flight, like the "fireflies." What were the fireflies, and what about the Earth's glow? There was a glow around the Earth, and Glenn couldn't explain this. Why was there this airglow when the sun was already down? So Carpenter had a camera with some very special film. It was a Hasselblad camera and Hasselblad was the Cadillac of the photographic world. So the company had given NASA two cameras—we didn't even have to buy them—they gave us top-of-the-line cameras to take aboard Mercury. Carpenter had his Hasselblad camera with a very sensitive, specially designed film from Kodak [Corporation, Rochester, New York]. One of his jobs, and he had several during the flight, was to take pictures of this Earth glow, and maybe they could get back and find out what the specific visual spectrum was. So Scott was proud of the fact that he had done some worthwhile science.

The most serious failure during that flight was in the automatic attitude control system. It functioned much like an autopilot in an airplane. You punch in the three [roll, pitch, yaw] inertial angles where you want the spacecraft to be pointing, and it will automatically find those. It had an inertial system, similar to an attitude gyro in a light aircraft—very rudimentary, but it worked. It was called the ASCS—Automatic Stabilization and Control System. As soon as Carpenter got into orbit, he put the spacecraft control system into automatic so that he could do chores, like stow stuff away, and whatever he had to do in the cabin, such as switch settings. He had a laundry list of things he had to do before he could even participate in the flight plan. I'm thinking like this lasted for 15 to 20 minutes, little things he had to do.

So he puts his ship into automatic control, because you had to maintain a certain attitude in orbit when you were occupied with mundane things, but his capsule wouldn't go into the pitch

attitude that he wanted. Well, Scott decided not to tell ground control because he was afraid that if he told them he had a control system problem, they would throw away the mission objective and try and chase the thing down, and if they couldn't figure it out, they were going to bring him back early.

Well, Carpenter was scheduled to make a three-orbit mission like Glenn did. Three orbits today is nothing—absolutely nothing—but in those days, three orbits was a significant milestone—that's four and a half hours of lonely weightlessness in space. A hundred miles from breathing normally with your feet on the ground. He wanted to make sure he flew his whole four-and-a-half-hour mission, so he didn't tell the ground that he had this problem.

Well, in Mercury, we were only over tracking stations for 10 or 15 minutes, and we didn't have station contact all the way around an orbit, so there were periods of huge gaps in coverage. But we also had an automatic system for monitoring some of the medical parameters: his pulse and his blood pressure were measured automatically on a fixed schedule. I think he had to push a button to make the blood pressure measurement system [BPMS] work, but once he pushed it, it was on until turned off. So when he got over a station, the medical controllers—and by the way, [Dr.] Chuck [Charles] Berry was one of the guys that sat in the consoles at one of those remote stations—I forget where it was, but I think it was Australia—and he was one of the "nobodies" in those days, one of many medical flight controllers. Anyway, I don't know whether he was the one that asked Scott about this problem, but one of them said, "Scott, we're getting really high readings in heart rate and blood pressure. How do you feel? Is something wrong? What's going on?" He said, "No, I'm fine. There's got to be something wrong with your equipment."

When we got the equipment back—you know, that system came back with the spacecraft, they did testing four ways to Sunday on that BPMS—they tested it, and there was nothing wrong

with it. Even if he had experienced a problem with the placement of the pickup microphone—the one under the cuff that inflates to get a reading—even if the microphone had somehow shifted askew, it wouldn't have given the elevated data which we saw, which was consistently high in orbit one.

So we tried to get Scott to admit in post-flight interviews, "Was something going on? Were you scared? What was happening?" but he never would admit it.

Truth be told, I think he got really scared that not only they might bring him back and he would be the anti-hero of John Glenn, but because it was possible that the control system wouldn't work properly and he'd have to fly retrofire and re-entry manually, that he couldn't reenter safely and might die. He might have sensed a panic, a fear that he might not control attitudes properly during the retro maneuver, when the three solid rockets fire to slow the spacecraft so it will come back.

The spacecraft was supposed to be pointed down at minus 34 degrees, and that angle was, of course, precalculated. Starting the 30-second countdown to firing was called beginning "retro sequence," where you punch the button, and 30 seconds later, the rockets fire. So there was a period of time in there when everything gets stabilized, system switches are checked, and the actual rocket ignition was supposed to be handled automatically. The pilot just sat there, checked gauges and switches and watched it happen. Well, the astronauts had trained in flying it manually, in case the gyro system wasn't working at all, and it wasn't really that hard to do. The rockets all fired roughly through the center of gravity, so there were only very small forces which could make angles shift, and then only slightly.

The ground folks took his word for it that there was nothing wrong with him, that it was something wrong with the medical measuring systems, and they tried to chase down his control-

system problem. They just didn't have enough time to figure out what it could have been and if there was a way to work around it. And by the way, if he had told the ground about the attitude problem early, experts on the ground could have chased it down. At the very least, he could have completed the mission and done the manual reentry like he did, but with no control misalignments. And, as it turned out, there was a simple 22 or 25 degree bias in pitch only. I can't recall which number and he could have cranked in minus 12 or minus 9, and the system would have held the capsule at the intended minus 34 degrees, all automatically. Scott could have monitored attitudes during the brief thrusting phase and if they had begun to stray, he could have immediately taken over manually and completed the burn without a problem.

But he didn't tell the ground when he should have, so flight controllers and their system consultants didn't have time to chase it down, and we had lots of very smart people on the ground who could have nailed that down completely in four hours—there were people analyzing it. Very bright guys in Houston would have seen the bias and checked that the system still maintained attitude, even if incorrect, and told Scott to watch it at say minus 12 after he put in a little blip of up thrust with the ASCS system on. It would have come back to minus 12 and held, but with the bias, he would know that was the planned minus 34.

Anyway, the upshot of the thing is when it got time for retrosequence, the ground said, "Scott, you're going to have to do the retrofire and reentry manually; you're going to have to fly"—they called it fly-by-wire—"you're going to have to do the fly-by-wire manually." He said, "Okay, I can handle that." So Scott and the ground got ready for retrosequence. He came up, he got the thing at the right attitude—and by the way, the gyro driving the attitude needle in front of him still worked, and he could still see what his attitude was—he got it at exactly the right attitude, and he punched the button for retro sequence. Well, in that programmed 30-second period of

delay, where things are getting timed out and stabilized—I not sure what actually happened during this 30 seconds—there were some things the systems had to complete during that count down.

He knew that he had 30 seconds to play with, so he punched in the button to turn on the ASCS again, the automatic system, in the hope that it worked, because he thought, "Well, if it works this time, I'm going to let it do the retrofire." It didn't work. The spacecraft just started pitching down. Here's the top of the capsule; here's the bottom. So it's aimed at minus 34 degrees. It just started pitching down, and it did it quickly. It wasn't just creeping. So he quickly turned the ASCS off, and he brought it back up to minus 34—because that's where it absolutely had to be for the reentry, for the retro fire—he brought it back up to minus 34, within a degree or so. But unfortunately, he drifted out of the orbital plane.

If you know anything at all about energy transfers, when the rockets fired, all the total thrust of those three small solid rockets had to be in the plane that he was traveling. If the thrusting happened to be out of the plane, as it was, then the component of thrust not in plane did nothing as far as slowing up for reentry; all it does is shift the spacecraft over a little bit. So some of that thrust was wasted on his little out-of-plane maneuver and effectively reduced the thrust contributing to slowing up his capsule to where he entered the atmosphere at a little more shallow angle than planned. It was the same thing as if you throttled down the thrust of the rockets. If you throttled down the thrust say five percent, then that means that he couldn't change his velocity enough to come into the exact entry corridor. If you throttled them down say 33 percent, he would skip and come in at a steeper angle. The higher heating caused by a steeper angle might be enough to cause pilot overheating or even death.

What happened was he came into the atmosphere at a more shallow angle and that caused him to land about 120 miles past the planned landing point. A more shallow angle and slightly

less velocity than he should have had, and that caused him to land much further downrange, well beyond the recovery ships. We knew that from the tracking him. We're tracking him, and thinking, "My God, he's going to miss his target point, badly! What's going on?" We had no idea why he was going long. I did a quick calculation after the flight, I remember, and if he had gone out to minus 35 degrees out of plane—he was at like minus 28 degrees out of plane—if he had gone to minus 35, he would not have reentered successfully. The capsule would have overheated inside the cabin to an intolerable level.

Just to explain to you what the entry corridor is—if you come in too steep, the heat rate is too fast, so fast that it soaks right through the heat shield and starts cooking things inside. So it's called an over-limit heat rate. I don't know how to give you an analogy except to compare a fire touching a metal car and the same fire touching a ceramic car. The heat rate through the metal would be at least four times that of the car with a ceramic coating and high enough to cook anyone inside.

The other side of the coin is if you come in too shallow, then the atmosphere doesn't capture you and you fly back out of the upper atmosphere but drop again back into it. When a meteor comes in, or any large object, anything reenters, and slows up enough, it's going to drop to the ground if it doesn't burn up first. If it doesn't slow it up enough, it's going to skip out like a pebble. When you fling a pebble flat just above the water, it skips. If he had gone 35 degrees out of plane, he would not have slowed up enough to capture. He would have skipped a bit and, unfortunately, you now come in at a much steeper angle. So he would have gotten the same problem as if he'd come in too steep, only later, and he would have cooked inside his capsule.

Gordon Cooper, Wally Schirra and Gus Grissom later flew in Gemini. Schirra and Shepard flew in Apollo, Deke [Donald K.] Slayton eventually flew, after first being grounded for

a heart murmur and much later being cleared by medics for Apollo-Soyuz [Test Project], and Glenn eventually flew in a Shuttle at age 77. Only one member from those original seven, who were credited by author Tom Wolfe as having "the right stuff," had no space flights after MA-7.

The other story I want to tell on Scott is quite amusing. He was out in the middle of nowhere floating in a life raft tied to his bobbing capsule, and that's the reason for the cover design on his [blue-cover] public release document. He is out there, all by himself with nobody around. He was the kind of guy that would get deep into his own thoughts. He was a guy that would sometimes meditate. A lot of times, you'd ask him a question, and he would act like he didn't hear you. "Scott, what are you going to train for tomorrow?" (long pause) "Oh, what'd you say?" So here he is way out in the Atlantic in this tiny life raft, way, way beyond the ships that were supposed to pick him up, and a helicopter came up from downwind and dropped three or four Navy frogmen into the water to assist him, to get him up into the helicopter.

Because the helicopter was always downwind, he didn't hear it. They don't make that much noise anyway, except for that familiar, hollow "flut-flut-flut." Well, this frogman swam unheard toward Scott and when close behind him said, "Are you okay, Commander Carpenter?" (laughter) Scott, totally startled, literally nearly jumped out of his life raft. He did talk about this after the flight, but that never got into any of the reports. He said it "scared the living hell out of him." But it gave the frogmen a good laugh.

Well, the story I want to tell you is they told him to climb back onto the flotation collar that had been inflated around the capsule to stabilize it in rough seas. The pilot wanted to make it easier for them to pull him up into the helicopter, so they told him to stand on the flotation collar and in doing so get out of the life raft, which was bobbing up and down too much in the sizeable ocean swells. He was to hold onto the capsule and put the end-of-the-cable thing, which is

graphically referred to by rescue personnel as a "horse collar, around his chest and under his arms so they could winch him up. And he did this. He's got his camera with him, as I told you. The Hasselblad was his pride and joy, containing the exposed film that he had taken on the flight. So there he is standing on the edge of the flotation collar, and the helicopter's starting to put tension in the cable, take up the slack, and lift him up the 15 or 20 feet into the cargo door. When they finally got the slack taken out, they told him to push away from the capsule so that he would be free swinging. He did.

Unfortunately, this extra weight now on the helicopter made it settle momentarily, and his whole body, encased in a heavy space suit, went right under the water. His head was completely underwater, but one of the frog men had a camera and took a picture of him. All you can see is his arm sticking straight up and out of the water with that camera in his hand. He was not going to damage that film and camera. He would have drowned before he would have damaged it—and that's a true story. I've seen that picture. I wish I had a copy of it.

Because he had taken his helmet off right after getting out of the capsule, his suit took on a ton of sea water when he was subjected to his unplanned "dunking." Later, one of the frogmen reported that he sat in the large cargo doorway of the helo, an easy lean from falling back into the drink, and cut a hole in the toes of both suit booties so the water could drain out. I'm sure he was not only tired from his orbital and post-landing ordeal, his long underwear body wrap inside the suit was soaked and horribly uncomfortable.

Oh, one last little anecdote about Scott. Once aboard the recovery carrier, and after a brief physical to see if he was medically okay, he was invited to get cleaned up and have a full, four-course, white-glove private dinner with the admiral aboard. Scott was dog-tired and emotionally drained from his flight ordeal and from bobbing for hours in the water. The last thing he wanted

to do was get dressed up in a stiff uniform and make small talk with an old man in a stuffy ward room. But Scott was a Navy man and so was the admiral, of course, so the latter pulled rank and insisted. Scott probably wanted a mouthful of junk food, a swig of booze, and a long, long snooze in a comfortable bunk, but there he stiffly sat eating the admiral's favorite entre, wishing he could be somewhere else. True story!

Since I'm telling secret stories, this is a good time to talk about Wally Schirra. Wally was a very colorful guy. I liked Wally a lot, and whenever he was at the Cape preparing for the flight, if I was down there, we would get together and have breakfast. The neat thing about Wally—he was driving an Austin-Healey 3000 roadster, which is a classic British sports car, and I was driving one too, so we had a common bond besides airplanes. As you might know, nearly all of the original Mercury astronauts eventually drove Corvettes, but that was after Schirra's flight, otherwise he would have only talked about his hot Corvette. So he flew MA-8 [October 3, 1962], and we used to talk about that, both before and after the flight.

Anyway, having breakfast with him one day, he said, "John, you want to join the Turtle Club?" I said, "What's the Turtle Club?" He said, "Well, it's kind of a joke. A bunch of us guys got well-oiled one night, and we decided we were going to start a new brotherhood called the Turtle Club. The gimmick is that you should know what to say when someone asks you the Turtle-Club question." I said, "What question?" He grinned broadly and said, "You ask someone, 'Are you a turtle today?' and if he's a member of the Turtle Club, he'll tell you what you're supposed to say, but if he's not, he'll say, 'No, I'm not a member of that club, why?' He's then informed that, according to an old tradition, he has to buy everyone a round of drinks. Of course, the guy can say, 'No, I refuse to buy you losers any drinks,' and walk out. But that was the deal. You had to buy a round of drinks if you didn't say the correct thing."

I said, “Well, what’s the correct thing?” He says, still grinning, “You bet your sweet ass I am.” Then with a straight face, he said, “John, are you a turtle today?” I immediately shot back, “You bet your sweet ass I am.” So he made out a funky little green card, reproduced on an office Xerox machine, and I became one of the original members of the Turtle Club. It was a joke with most of the original seven Mercury astronauts and their drinking buddies, except probably John Glenn. Glenn never drank and never partied; he didn’t go out to the bars. But the other five guys would have joined. Even today, 45 years later, in the NASA area right on the lake, there is a joint called The Turtle Club, in honor of Wally and his drinking buddies.

I think Deke Slayton was the CapCom for MA-8, but I’m not sure—anyway, it’s in the public release document. But as they’re going up through launch, CapCom had a bunch of questions they had to ask the astronaut: “Is this working? Is that working? Is everything fine? Has the clock started?” They always said the clock is started. After Deke got all those questions answered, he said to Wally, “Are you a turtle today?” You know, a little joke between the two of them—and Wally said, “Going to voice record only,” and he flicked the transmitter off—the thing that sends the voice signal down to the ground, and it went just to an onboard recorder, so the switch position is labeled 'voice record only'—and he said, “You bet your sweet ass I am,” and then flicked back to communicating with the ground. Wally wanted to make sure it got on the tape so he wouldn’t have to buy a round of drinks after splashdown.

And, by the way, for historical posterity, there were always "splashdown parties," where NASA folks and contractor people drank and danced to all hours of the early morning to let off steam after months of putting their noses to the grindstone. Some of the Apollo parties were monumental, and after Apollo 11, contractor-funded parties lasted from Friday to Monday. I never did it, but some guys never went home, staying until work began Monday morning. You

can imagine how they looked, hung over and unshaven and dressed in disheveled clothes. Of course, some guys looked like that nearly every day, especially if they were going through a divorce. The old Flintlock restaurant and bar was the favorite party place after splashdown, and it's not even there any more, having been torn down to build a kid's video game and pitch-and-putt establishment.

Well, unfortunately, my job was to get the tapes transcribed and then edit them. We had several people sitting there at IBM typewriters doing the transcription. I didn't do that, but I had to edit for technical accuracy. Anytime they used an acronym like ASCS, the automatic stabilization and control system, I had to put in parentheses that's what that meant. So I had to say what all of those acronyms were, and I had to make sure that they transcribed it correctly. When they got to the part about, "You bet your sweet ass I am," I couldn't put that in the report. I asked Bill Bland, who was the assistant project manager, "Could we put this in?" He said, "No, no, that's the kind of thing that if it gets out in the public, we're ruining the delicate ears of all these innocent little kids in school. We can't put that in, and you figure out how to do it, but no, we're not going to put it in." So I put in the public release document, "Astronaut gave correct response." (laughter) I looked that up just the other day, and that's what it said. So history will never know that he said, "You bet your sweet ass I am," other than my saying it here on this tape. That's kind of a cute story.

I will say one other thing about Wally; he was a smoker. The guys that packed the survival kits and the personal kits for the astronauts, the things that they take up into space that they have a little bit of freedom about, they packed him a ham sandwich and a pack of cigarettes. The deal in those days was, "What if they don't land anywhere near recovery people? What if they're out in the middle of the Gobi Desert or wherever?" I mean, they're way out in the middle of nowhere.

They knew he would want a cigarette. (laughter)

I remember Chuck Berry specifically asking, "Was that dangerous?" and hearing, "Yeah, all those cigarettes can out-gas toxic fumes, and who knows, in a small capsule like that, what would have happened." That was a no-no, that they were not supposed to do, but he definitely had those items in his survival kit. Never did smoke them, because he landed unbelievably close to the carrier. I'm positive he was within sight of the carrier, because news photographers got pictures of his capsule hanging from the 'chute. I was the one that designed the report covers, by the way, of these public release documents, and I remember the picture on the cover of the MA-8 public release report shows the spacecraft coming down with the carrier in the background. So, he didn't immediately need a cigarette.

But the ham sandwich was another thing. They weren't supposed to eat anything like that, because they were in orbit for four and a half hours, and in Wally's case, it was six orbits, so what's that? Nine hours. They didn't want him to eat something that would cause a problem because he couldn't go to the bathroom—I hate to say that. So those were two no-nos. Wally wasn't supposed to have cigarettes, and he wasn't supposed to have a ham sandwich, because if he'd gotten hungry inflight and eaten that thing, who knows what would have happened in his suit once it was fully digested.

WRIGHT: Talk about the differences of creating the post-flight engineering memorandum reports compared to the public release document, because you were responsible for both of those.

BOYNTON: There were four kinds of documents that were put out after a flight—now, this is in Mercury. We didn't have a public release document for Apollo, so I didn't do this for Apollo,

and we'll get into that later. But there were four kinds of documents. There were the immediate management summaries—a kind of a look at the flight, and we had this, and we didn't have that. It didn't go to anybody except top managers, and I think it only went to one or two people at McDonnell Douglas Corporation, the contractor. So it was an in-house secret thing about, "this is kind of what we're looking at." That came out, and I think it was the three- and the five-day report, but I could be wrong. Anyway, it was a short time after the splash time.

Then we had the post-flight memorandum that was the very detailed engineering report that went out to all of the people that worked at the Manned Spacecraft Center, and if I say MSC, that's what I mean. All the systems people had to see what the other systems people were doing, and what were their problems, and how did those relate to mine. It also went to the contractor, in this case, McDonnell Douglas.

So within two or three weeks—I forget what the deadline was—they had a concise engineering report, and I had to work night and day to edit that. The way it worked was the systems people, the specialists, like the environment control system people, would give me a complete report on what happened in the environmental control system. Did we meet our parameters? Was it within range? Was it working okay? If it wasn't working, what happened? They didn't have the time to do a lot of testing, but they had enough time to—they did preliminary testing at the Cape, by the way, and they had some basic laboratories down there. So they tested things that came back with the capsule to see how they worked.

By the way, I want to make one quick comment, because I'll forget to say this. When the space capsule inadvertently sank after Gus Grissom's MR-2 [Mercury-Redstone 2] flight—he was the second American into space—we were not able to get the capsule back to check out why the hatch explosive release system blew. That secret went with him to his grave, because the cynics

all thought he deliberately blew the hatch because he was afraid the heavy sea state was going to cause him to sink with the capsule before they recovered him with the helo. His astronaut buddies knew different, because Gus was no "chicken," but that cloud hung over him to the day he lost his life in the Apollo I fire. So, otherwise, we got the spacecraft back after all orbital flights, and we could do quick-and-dirty analytical tests. So the postflight memorandum report was a result of those preliminary tests and good engineering judgment—you know, "this is what it looks like." In Carpenter's flight, as I said, we tested the BPMS 29 different ways, and it was working fine, other than the possible shift of the microphone.

That report went out, and then after everything quieted down, the conferences were over, and the public release document was distributed, I had to do what was called a technical memorandum or a technical note. NASA had formal report categories in those days. The people that did the aeronautical stuff at Langley and even out at Ames [Research Center, Moffett Field, CA], when they turned out a document for the general public, it was either called a technical memorandum [TM] or a technical note [TN]. I'm not sure what the difference was, but I know one of them could be classified confidential. I believe it was the TM, but those reports are archived by number and can be obtained even to this day.

The final engineering report for Mercury was a confidential TM, and basically it was a rehash of what was in the postlaunch memorandum report, but everything was updated. If they ran more tests, if they changed their mind, if they found out something new—I had to turn out a very accurate document, and that took sometimes over a year. Since I didn't go Glenn's postflight report for MA-6, it took me about a year and a half to get out his TM. Those were very hard documents to turn out because we knew that they would be available for review literally forever. The postlaunch memorandum report that had to be out in a couple weeks, those were typically

thrown away, soon to be replaced by the official TM. Once people read through the postflight memorandum and they learned what they wanted to learn, they tossed them. There are very few of those around, so they are collector's items.

WRIGHT: Then the public release document, was it something you had available if someone asked or were they actually distributed?

BOYNTON: That's a good question. I really don't know why they did that, but I think there are two answers to that question. Again, no one ever told me this; this is just my guess. Number one, NASA, after it was formed in 1958 and space flight began to be in the public vernacular, a lot of school kids, particularly high school kids, that were interested in—I was in the science fair, by the way, when I was in high school, so that was an ongoing kind of thing then—they would write to NASA and say, "Tell us about the astronauts. Tell us about the capsules. Tell us about the spacecraft." So I think the public release documents were partly to satisfy that, that a lot of science teachers and a lot of kids were requesting the results of the flight, and the attitude was that the taxpayer pays for it. They have parents that are going to say, "Well, I paid for this, and my child has a right to know."

The other thing is, it was one of our public relations tools—not a very good one, by the way. In our interviews today and whenever we meet again, I really want to talk about public relations and how NASA really dropped the ball. But that was one of the public relations vehicles, that if anybody wrote NASA and said, "Well, what really happened on Carpenter's flight?" or "What really happened on Glenn's flight?" they had this public release document to shoot back. This one point to document is NASA SP-6. SP stands for "special publication." You can see,

with the sequence number in SP-6, that there weren't many before that. So that's the two things: 1) the taxpayer paid for this, so they have a right to know; and the other thing is they got a lot of requests from school kids doing projects. That's the reason for the public release document, and it was a lot of work.

The complete answer to your question is that a few hundred of the public release documents were sent out to non-technical folks around NASA and with the major contractors so they could be conversant with outsiders. By the way, they came out with one for MR-1 and MR-2, Carpenter's and Grissom's flight, and I have those somewhere. But you know, hardly anybody asked for those, so they did not get a wide distribution. But a lot of people wrote in and wanted to know about Glenn's flight. We couldn't send the technical memorandum, because I think I told you that's confidential. In fact, it wasn't even out. A year later, if they were still trying to get information, they would say, "Sorry, we're still working on that." The public release documents had to be out quite soon, within a month or a month and a half.

WRIGHT: They were on a different level of information, right?

BOYNTON: Yes, yes. I'm glad you brought that up. I had to write in two different styles. I had to write in an engineering style, which had to be accurate, it had to be professional, it had to be the kind of thing that you would find in a journal, a serious journal. I couldn't make mistakes, in other words, because other people would read them and say, "What does he mean?" So I had to be precise on the engineering. On the public release documents—and I'm glad you brought that up—I had to write it as though a fourth- or fifth-grader could understand it, and it couldn't have a lot of flowery engineering technical terms, and it had to be written understandable to just about

anybody—the lay person. That was really hard, because I would read through it and say, "No, there's too much technical BS there; I've got to take that out."

I really am proud of the fact that a normal, intelligent person, particularly someone with a bachelor's degree in any subject, could read through a blue-cover report and understand what it was saying. A little bit later, I want to talk about a book that I wrote called *Launching to the Moon*, because there's an interesting story that goes along with that, but I don't want to do it now. But that was one of the skills that I had. I was able to write for the lay public in a way that a fifth-grader, or very bright fourth-grader, could understand it.

I was very fortunate in one regard, that when I worked in Mercury, our man heading up the public affairs office, we just called it PAO, "Shorty" [John A.] Powers was the famous guy during the Mercury period. He was the face of NASA, and quite a colorful guy he was. He was from the Air Force, I think, an ex-military guy. But he was the interplay. He was like the president's press secretary. That was one of the good things. He was one of the good guys, and he came up with the term "A-okay," I remember that.

NASA got maybe thousands of requests for speakers, and they tried to get people at MSC to go out into the world and give talks because they knew the general public was keenly interested. Well, most of the managers could not travel to make speeches because they were just too busy. They had schedule-sensitive things they had to do. The Chris Krafts of the world, the people that we all saw on television making the tough decisions, the public wanted to have them come and talk. Well, those guys couldn't get away unless it was some really big deal, like say to a room full of politicians who held NASA's purse strings.

Instead, to fill speaker requests, PAO went down into the ranks, and they asked me—they didn't have anybody else in Mercury that was going out and giving talks—and truth be told, they

didn't have anybody who wanted to. When I think of all the characters that were in the Mercury Project Office, they either didn't want public exposure because they weren't that eloquent, or they didn't have time. So there was nobody in Mercury that could, or would, do this. When they came down to the Mercury office and said, "Somebody wants to know about Mercury," I was the only one. So, while Mercury was still flying, I started going out and giving talks on Mercury because everyday organizations would specifically ask for that.

I became an official NASA spokesperson, and later on, I branched off and talked about Apollo. I knew almost nothing about Gemini, but I knew enough to satisfy the general public. Quite often, I'd go out and say, "This is what the manned spacecraft program is doing. We've already done Mercury; we've learned this. We're doing Gemini now, and that's for the development of the rendezvous maneuver, and then we're going to go on to Apollo." I had nice models. I had models of the Saturn V and the LM, and I really enjoyed doing that. I gave about 75 talks—that's a lot—to all kinds of organizations: Rotary clubs, Kiwanis clubs, church organizations, schools. I went to a lot of schools—high school kids' general assemblies—and to the Air Force.

This is one thing I want to mention. One of the really great things about being able to do this was I got to fly to these Air Force bases in military airplanes. The flight that I remember the most is I got a request from a class of graduating air police—you know, like MPs [military police] that we've heard of, only they were APs [air police]. The air police were graduating from a school up at Minot Air Force Base, which is in North Dakota, and they wanted to have me come speak at their graduation. They asked if NASA would send one of their managers, and NASA said, "No, but we'll get someone to come up." So they actually took me up there in an F-106, which was built by General Dynamics, my old company, as it turns out. It's a delta-wing fighter, and

supposedly [former President] George W. Bush learned to fly one in the Air National Guard. God, that was so much fun, to fly up there in a training version of a 106. I will never forget that. The Air Force pilot actually took me supersonic.

I love this story, because it's the sort of thing that I don't think anybody else in your oral history is going to tell, and it's a wonderful story. The story is a story about the stick-to-it-iveness and the dedication and the resolve of these people that wanted to get NASA's luminaries to come and talk with them.

Sometime during the early Apollo program, when I early worked on Apollo, they wanted somebody to come to a little town called Tulia, Texas. Well, I had never heard of it. Tulia, Texas. They wrote a letter to NASA, Manned Spacecraft Center—they just said "NASA in Houston"—and it went to public affairs, obviously. But the letter said, "We would like to have one of your astronauts come up and speak to our Junior Chamber of Commerce"—I remember that was the outfit—"that we have an annual convention of the Junior Chamber of Commerce"—and by the way, Tulia's up in the grain belt, up in rural areas, so most of these people are grain farmers. "We would like to have one of the astronauts come and talk to us." Of course, the original seven were still working at NASA in those days. NASA wrote back politely, because this was a small town and a small group of people, because they always ask, "How many people are going to be at your function?" and I'm sure they wrote back and said, "Oh, probably 50 or 60."

NASA wrote back and said, "We're sorry, but the astronauts are very busy; they have a very tight schedule. They get lots of requests to speak, and they can only take on maybe one or two of these. We're very sorry." They didn't say, "We'll send someone else," they just said, "We're very sorry." These people wouldn't give up. They shot another letter back: "Well, we understand the astronauts can't come up, and they're busy, and all that, but what about one of your

top managers? Can you do that?" They wrote back and said, "Well, all of our top managers are on travel all the time. They're away from their families, they work night and day. I'm sorry, we can't send one of our top managers" like a Chris Kraft.

Then they sent a third letter: "Well, if you can't send one of your managers, can you send one of your engineers, one of the people that has worked on the program, and they can tell us what it's all about?" NASA wrote back and said—and again, it's because it was such a small group, and it was a town that no one ever heard of, I know that's what was going on—said, "All of our engineers are working night and day. We have to land on the moon by 1970. These guys would love to come up, but they're just too busy. By the way, we don't have enough travel money to send a guy off on a trip. We have very restricted travel funds."

They didn't give up. They sent another letter, and they said, "If you can't find an engineer to leave and come up during the week"—and by the way, they implied that they thought we worked from 8:00 to 5:00 Monday thru Friday, which was, of course, patently untrue. So NASA replied with the implication—"These guys are extremely busy all week long." So the town wrote back, a fourth letter and said, "If you can get one of the engineers to come up and talk to us on the weekend, we will fly down—a grain company up here has a private airplane—we will fly down and pick him up in Houston and fly him up to Tulia." I was a private pilot then, and I was really excited about flying—in fact, I had just started learning to fly—and I asked them, I said, "Find out what kind of an airplane they're going to come and pick me." So it was a Beechcraft Bonanza, a fast single-engine airplane I just happen to love. It's a beautiful airplane. It's the V-tail, if you know anything about airplanes. They were going to come down and pick me up in a Beech Bonanza. I said, "Tell them I'll take it."

So NASA wrote back and said, "We have an engineer who will come. He will take his

own time, he will take off his weekend, if you fly down and pick him up." So they did. The end of the story is this: they said my wife could go along. She didn't ever want to fly, so she didn't go along. So they sent a guy and his wife and a grain-company pilot, to pick me up. There are four seats in a Bonanza. I got to fly in the right side, the pilot flew in the left seat, and this couple that were part of the Junior Chamber of Commerce came down with them.

We flew up there, to this little town about 35 miles south of Amarillo, and it's out in the middle of a giant Texas grain pasture. If you know anything about Lubbock, you know Lubbock is always like, "This is the signature town of Texas." Tulia is the signature town of the Panhandle. It's out in the plains in the middle of nowhere, and they've got grain elevators all over the place, and they had this little grass strip, probably about 1,500 feet long. We come upon the town, and we're circling to come around to land, and I looked down to the ground and saw half the people in the town out there to meet me.

I looked out, and I said to the pilot, "What are all those people doing?" "They're there to welcome you." So I suddenly became God. I was their hero. Their link to the outside world, the world of high technology. I gave them a wonderful talk, and we had a wonderful evening, and the banquet was fun. What's interesting is they had a dance after the banquet—I have to tell you this, too. Of course, I'm alone; as I told you, my wife didn't go. So I'm at the dance just because I'm trying to get to know these friendly people a little better. I could have gone back to my hotel room. But I'm hanging out at this country dance, and this guy came up and said, "If you want to dance with any of these ladies, go ahead. It's okay, even if they're married." That's a neat story. It's really nice. I spent the night, and they flew me back the next day. I can't believe how intently these people wanted to know about manned space flight.

About three years ago, I wrote a letter to [former NASA Administrator] Mike [Michael D.]

Griffin, because I really didn't like the direction that we were going, and I hope that when I conclude with you, that we'll talk about that, the direction of the space program, because I think they're making a lot of mistakes. One of them has to do with this public affairs business and public relations. But I wrote a letter to Mike, and I said, "There's something that I don't think NASA headquarters appreciates fully, and that is, I gave 75 talks to the general public when I worked at NASA." I said, "In those 75 talks, I got to know the people really well—the people out on the street, the people that pay the bills." I said, "I learned two remarkable things from this. Number one, they had absolutely no idea what was going on technically in the manned space program. They had no technical basis for understanding what we were doing. They didn't know what Earth orbit meant. They didn't know anything; they were technically disadvantaged. Some would say, "technically challenged," because they were ordinary folks.

But the other thing I learned was that they're all truly fascinated by space flight. It's like the best TV show in history. They wanted to know all they could, because not only were they paying the bills, but it was something that was new and different, and exciting. It's like knowing about Christopher Columbus before Columbus left, you know. Everyone would have been afraid he would have fallen off the edge of the Earth; they wanted to find out why he didn't.

So I said, "We need to do something that will enflame the American public and inspire them like Apollo did." Well, sadly, NASA isn't doing that. A lot of the guys, a lot of the people that work in NASA have been commenting on that, that this business, this initiative of going to the moon first and then to Mars, that doesn't inspire anybody. So I do want to talk more about that. But my 75 talks led me to find out that ordinary people in Main Street American really are fascinated by this new frontier.

[End of interview.]