

NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT

EDITED ORAL HISTORY TRANSCRIPT

KATHRYN D. SULLIVAN
INTERVIEWED BY JENNIFER ROSS-NAZZAL
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ROSS-NAZZAL: Today is May 10th, 2007. This oral history with Kathy Sullivan is being conducted for the Johnson Space Center Oral History Project in Columbus, Ohio. Jennifer Ross-Nazzal is the interviewer, and she is assisted by Rebecca Wright.

Thanks again for taking time out of your busy schedule to meet with us.

SULLIVAN: It's a pleasure.

ROSS-NAZZAL: We certainly appreciate it. I'd like begin by asking you about your interest in space as a child.

SULLIVAN: Sputnik happened when I was six; in fact, one day after my sixth birthday. I was born on October 3rd, so I'm almost a Sputnik baby. My father is an aerospace engineer. My brother, from as early as any of us can remember, wanted to fly. So there was a background in our family and an appetite on my dad's part towards all things space, and like all little kids you follow your parents' interests to some degree.

I remember going out on the front lawn with my dad—we lived in New Jersey at the time—to see if we could see this thing going overhead. My actual understanding, of course, of what was going on was tiny, but it was something dramatic. It was something that intrigued

Dad. It was, "Come on, let's go see;" so, of course, you go running out to see. That event stands out.

We moved to California when I was six. My dad was, like I said, in aerospace, and he could recognize that the impetus and the gravity of all that was going to move west. Someone from his company had gone out before to one of the small California startups and had right away seen a place where my dad's skills would fit and started lobbying him to come out. We moved out to the San Fernando Valley in 1958, and that made a big change in how close we were to the aerospace activities in the 1960s.

My dad was with the Marquardt Corporation. They did lots of different projects. I have no information about what he was working on when I was that young. I do know that Marquardt, even when I was in the Shuttle Program, made reaction control system thrusters for spacecraft.

Airplanes are suddenly all around. Where he works is right near Van Nuys Airport. Before very long he's linked up with guys that like to go fishing and flying. One guy in particular liked to fly to the better fishing grounds in the little Cessnas and Pipers that the company flying club had. So before very long my dad's joined the flying club, and everything aviation and aerospace is coming closer into our world through the family channel.

At the same time, NASA is founded. *Life* magazine arrives every week, and *National Geographic* issues are arriving every month with these breathtaking, amazing stories about the new space frontier, the seven astronauts, Sputnik, and what it all means. It was fabulous. I ate all of that stuff up. Every single issue of *Life* and of *National Geographic* in the early sixties seemed to have a really entrancing story about who are these guys, what they are going to do, and what is spaceflight like. Right next door to it or a page or few later there would be some

story about aquanauts, because that was also the era of Conshelf III (Continental Shelf projects) and a project that tried to drill all the way down to the mantle of the Earth, the Moho Project.

I just was fascinated by all of those things. Nothing in my thinking at that time was oriented towards job or career. I was just absorbing them as grand adventures that were happening out there that were of a huge scale and amazing. I was curious about what they were doing. I was curious about how they did it. I was curious about, “What are each of these people like?” Not “how do I become one of them,” but just “who are these people? How interesting. What are they doing?”

I think that general sense of amazing adventure afoot in the world and getting glimpses of it was really what entranced me, and I think that at some deep level this set a strong sense of wanting to be part of such adventures. There are people who get to do these amazing adventures, and that clearly would be really cool. Just that feeling of what must it be like to be a part of things like this was very compelling and very moving.

I followed, once the space program really got going, Alan [B.] Shepard’s flight and later John [H.] Glenn’s and then the whole sequence. I was mesmerized by all of those. I would change my schedule, finish my homework, do whatever it took to be able to be by the television and watch what was going on. I was avidly reading everything in the newspapers and everything in *Life*, *Look*, and the *National Geographic*. It’s interesting. Our whole family found that interesting, but I don’t recall all four of us sitting around the television watching the lunar landing.

I’m struck by so many people who remember being in their school class or sitting with their whole family. I remember sitting on the floor in our den probably about two feet away from the TV screen, watching the landing, and listening to what was going on. Of course, they

didn't have real great video right at that moment, so they were cutting back and forth to mission control. I remember just sitting there scanning the TV, listening intently, and trying to really understand, "What's going on here" to really make sense of it. It wasn't like being a spectator. It was like being in it.

I remember when Buzz [Edwin E. Aldrin]—it must have been Buzz, not that I knew that at the time—called out from on the spacecraft, "Contact light." I thought, "What was that?" It's 1969, so I'm seventeen, and I remember realizing just in this instant that, "Oh, wow, these guys aren't down yet, and this guy just said, 'Contact light.'" That means he can tell something about how close to the ground they are. How cool is that? These guys have curb feelers on the spacecraft to know when they're near the surface. That little tiny engineering insight just kind of snapped into focus and was a real interesting kind of, "Ooh, that's cool. I understand a piece of how this all is happening."

You've got to remember I was just finishing high school, and I was a college prep language major in high school. I was not aiming at the sciences. I had been taking French since eighth grade and was pretty fluent in it by that time. I had started German in ninth grade, was pretty comfortably fluent in that, and was heading off to UC [University of California] Santa Cruz, because they had a great Russian program. My real impetus and interest from back at very early ages was geography: maps, places, landscapes, cultures, and people.

Career-wise, my theory of the case at that point was, since I had recognized a really unusually strong language aptitude, capitalize on that. Learn a lot of languages, learn the ones that interest you, and somehow that's at least an avenue that will lead towards other countries. Whether it's get to travel and live there or just know about them and study them, I didn't know then. In my advanced placement French class, we studied literature and history, which gave me

a sense of understanding about France, all that informed the French culture and, I thought, some insight about what it meant to the French the people.

That was where I was heading, and with that backdrop to have a sense of comprehension about even the tiniest little part of the Moon landing I had just watched was really pretty delightful. My dad's interest in flying—he'd always been interested in flying. He flew in the Second World War and left the Army Air Corps with the kind of pilot's license that lets you transition to the civilian world. He just hadn't used it really until we moved to California. When he fell in with that group of guys that liked fishing and greater adventures, he got active in it again.

I think he was also probably pretty consciously thinking about my brother, who was, as boys tend to be, a little slower to find his footing and gain his confidence, but was just addicted to and mesmerized by airplanes. This was a great way to do something my dad liked, do something we kind of all liked, and give Grant a boost on developing his own skills.

I also had a very strong interest, and this was apparent back in first and second grade, just a real intrinsic curiosity about how engineered things work. I kind of always flunked the dolls test. I never found the dolls interesting. The dollhouse stuff I found interesting, but from an architectural point of view: building them and I'd want to lay it out differently. I don't want to just move the furniture around, and I sure don't want to just sit there and imagine conversations that never happened. Let me go build another house; that was more interesting. Or fly the airplane or steer the bass boat.

So that whole world of operations and how do things work somehow always seemed natural to me and more interesting to me, and interesting to do. I liked doing things and liked the fun of finding out how well can I do something. "How well can I drive this boat? How well can

I fly the airplane?” I clearly had both sort of a technical operational bent naturally to me and was comfortable with it, but my aim at the time was off towards languages.

Just as two little illustrations of how early this how-do-things-work bent showed up in me, back in kindergarten. This is a really funny story. I think I was probably kind of mortified at the time, but it’s funny now. One of the little silly exercises the kindergarten teacher had everybody do is write down their Christmas list, bring them to class, and we’ll talk about Christmas and what are people interested in.

This would have been something like 1955 or 1956. There was a toy being marketed that was a pom-pom gun, so it was a little plastic gizmo sort of made to look rather like the gun turret on the foredeck of a battleship, and the two little levers or buttons that you operated it with. I remember seeing on television the commercials for this gun, and the barrels of the gun would actually move in and out to simulate or to echo the recoil of a real large naval gun. I can remember even now just being mesmerized by, “How do these things move? Look at that; they move in and out.” Something about the little details that they had designed in the gray plastic struck my interest.

So I made my Christmas list up that same year and took it to this teacher, and that gun was on it. Everything on the list, I guess, was guns. I just probably started paying more attention, once I was interested in that one, maybe I just paid more attention to other ones. It was a curiosity to be able to see one, operate it, and actually see “how does it work” and hear what it sounds like. It was all that. It had nothing to do with guns. It had nothing to do with weapons, combat, or warfare. It was just, “I wonder how they do that. I wonder how it works.”

I can remember the teacher standing up, reading through lists, coming up to mine, reading a couple of these out loud and sort of recoiling a bit, blanching a bit, and then chuckling

and trying to laugh. I think she was quite taken aback and then kind of trying to recover herself and shift gears. Her little toss-off, laughing, joking line was, "Oh, well, our little gun moll." I remember thinking to this day, "She doesn't get it. She doesn't get it. That's all it is."

Then in second grade we had a reading contest, a library contest of some sort, and the book I ended up reading was some elementary school kids' manual of spaceflight. That's how I learned about escape velocity, and again it was this really neat sense of a moment of discovery that there was such a thing as escape velocity. You could know what it was, and it was known what it was. If you got going that fast, you could leave the Earth, and I just had never thought about that, but there actually was a speed that you'd have to be going to get away from the Earth.

It was just one of those little click moments where a sense of some comprehension beyond the particular, the specific thing that you read, or beyond the phrase you heard an astronaut say. Something clicks, and you realize you've got a little broader comprehension of what's happening than just confirmation that you heard the words or you read the thing on the page. I found those experiences delightful. Those were really cool.

It was pretty apparent early on that I held an interest in engineering and operations. Once I went off to college into the language major, I was absorbed in becoming an adult and figuring my way through the world and figuring out college. That was 1969 to '73, so the latter Apollo missions, Apollo-Soyuz, and even the Skylab missions all happened in a time that I didn't pay much attention to them. I was now more absorbed in other things and trying to figure out my pathway in a different direction, so much less awareness and much less avid tracking of the space program for me, basically, after Apollo 11 because of the different path I was taking.

The exception to that, of course, would be Apollo 13, because that broke through everyone's awareness to some degree. It's nowhere near as vivid to me. I remember hearing

about it and following it, but it didn't capture my whole world and my whole attention like each spaceflight really had done through junior high school and high school.

ROSS-NAZZAL: Was there any one person or event that caused you to switch gears from language into science?

SULLIVAN: Yes. The language to science switch happened in my freshman year at college. I had a French lit [literature] professor as my main advisor, and UC Santa Cruz required that everyone, whatever your major was—if you were an arts major, for example—you had to take three science courses to round yourself out, and the reverse was true if you were a science major. My French lit advisor, John [H.] Hummel—I'm sure by this point he was quite an expert in having a sense of which of the science courses seemed palatable and engaging. He was not the kind of guy that wanted to just check the block and get it done. He was more of a learner and a teacher than that.

So his take was, "You're going to do it. Don't try to get out of it. There's a worth to doing it, and here are a couple of courses that are really taught well and taught with respect; the professors teaching them respect the proposition of broader education and of teaching to non-majors. You're not getting dumbed down, you're not getting disdainful stuff, and you're not getting perfunctory lectures. 'These kids are just here filling a seat for twelve weeks, and I just want them out of here, too.' There's a real passion for teaching, and there's passion for the subject."

There were three courses he recommended. One was a theoretical math course, which is almost like a puzzles course, a topology course; sort of intellectually amusing. Took that one in

the middle. The two bookends were ocean science courses, starting with Todd Newberry's marine biology course the first quarter of freshman year, and in the final quarter of freshman year Gary [B.] Griggs' broad survey of general oceanography.

So Todd Newberry was a fairly young prof [professor], marine biologist, whose favorite critters were sea squirts, tunicates, really odd, funky, neat little critters. It was a couple-of-day-a-week lecture course with only one book, and it was not a textbook. The book we used was called *Great Waters* by Sir Alistair [C.] Hardy. It's basically a storybook.

Hardy sailed with the Royal Research Ship *Discovery* on a two-year expedition in the mid-twenties, 1925 to 1927. Left Southampton, England; went down the backbone of the Atlantic Ocean; called in at the Canaries; called in at the Cape Verdes; called in at Ascension Island, a tiny little flyspeck of a volcano; called in at St. Helena, another tiny little flyspeck of a volcano where Napoleon once was exiled; called in at Tristan de Cunha, at Gough [Island], at Bouvet [Island]. Then on down to South Georgia. Then worked the southern ocean to understand the ecosystem that was supporting the whales and the great whale fisheries.

This book is kind of equal thirds a young man's adventure story, first great adventure at sea, a coming-of-age tale and a mariner's travelogue—here we are at South Georgia; what was it like as we pulled into Tristan de Cunha? What did we see when we got to Bouvet? And what was it like at sea—and the scientific, a general descriptive scientific memoir. How did we capture plankton samples? What did we find, and what did the variations seem to be and more and more detail into that as they got into the southern ocean.

Between that, Todd himself, and his lectures were entrancing. At least once a week we'd go out in the field tide pooling somewhere along the shore, and I just looked at all this and, said, "Who knew? Who knew?" There is a profession that is all about being out in the world. There

is a profession that you can't do well unless you're out in the world, and you have a sense of the planet and a sense of its geography and a sense of what's out there.

Who knew there was a job where this is the job? I knew jobs like you see on TV: doctor, nurse, teacher, and jobs like my dad. Drive to work; go to the office. Probably for most kids, that's the kind of understanding they have. The actual topology or the actual ecosystem of the world called work is very narrow, a thin little conception when you're finishing high school, and it's probably much less so maybe even today still for girls than for boys. Certainly it was less so at the time.

This was another one of these major discoveries. Todd was fabulous. The lectures were intriguing. I was having a ball running around in the tide pools, and this book—I mean, this is what these guys get to do? That's really cool.

As an aside, I don't know how and why the ocean stuff started appealing to me, but I was in and out of Girl Scouts through school, somewhat as a function of when transportation and other practical things worked out. I got back into Scouts on my own accord in high school, because some of my softball team buddies were in a Mariner Girl Scout troop. They were fun. They were neat to hang out with. The stuff they talked about doing sounded pretty cool. The really cool thing was once a year they would charter a sloop, put the whole troop aboard, and sail over to Catalina [Island] for a three-day-weekend camping trip.

Besides the friendship, it may have been nothing more than I got to play around in little outboard motorboats with my dad on fishing trips and I flew airplanes, but I'd never gotten to sail. It might have been nothing different than a bit of novelty of, "Ooh, another boat," and something else to do.

I joined that troop, had a blast, and went on that sailing trip. Once a year, we also had a sort of camporee competition called Gam, which all the Mariner troops would come together. It was breaking out the different sort of basic skills, mariner skills, and seamanship skills, from knot tying to small boat handling to navigation, and every team would compete across that whole front for each category and then a grand prize.

We did really well the couple of years that I was in the troop, because they'd always been abysmal on navigation. The boat stuff was easy; figuring out the navigating stuff had perplexed everybody. I knew the navigation stuff cold from navigating airplanes since I was about twelve or thirteen; the translation of that to the way you do it with ships and boats was simple, so I ended up being the navigator and helping out with that.

I had gotten some of the ocean taste and some of the sense of adventure. What's not to love about the beach and being at sea? The friendship, the operational side, and probably in a sense this was the first sort of active domain, outdoor operating "do things" domain that was really mine. It was not me being the number two kid with Dad or with Grant, and that probably played a role at about that time too. So that's just another contributing factor. By the time I went to college and met Todd Newberry, we're out at the shore, and I discover that these guys go off in great ships all across the world's oceans, this sounded pretty good.

The third quarter of that year I took Gary Griggs' general oceanography. Oceanography is a multidisciplinary field by definition. There's physical oceanography that focuses on tides, currents, and waves. There's chemical oceanography that focuses on the chemical exchange between the land, the sea, and the atmosphere. There's biological oceanography or marine biology; that's what I had studied with Todd Newberry. Then there's geological oceanography,

which is kind of what Gary was in, and I actually ended up in the Earth sciences department at Santa Cruz.

Gary was teaching a survey across all four of those disciplines with more emphasis on the physics and the geology, and Todd had taught really just the biology. Gary's a fabulous teacher. The class was just as fun. He might have been five years older than any of us in the class. He was a real fresh-out young kid, so he's one of those fabulous experiences where you're being taught by almost a peer, and he's treating you like a peer. Still had very much the California surfer dude kind of look to him. Still does today; he's a little grayer. Just like Todd's course, it just captivated me.

Near the end of that course, I finally mustered whatever courage I had or focused my curiosity enough to go up to him after class. He reminds me to this day that I didn't exactly have a brilliantly composed question to put forward, but I put it to him anyway. It was something along the lines of, "I took Todd's course and really liked that. I'm really enjoying this course, and I'm not entirely even sure why." And the question was, "What do you guys do? What does being an oceanographer mean? I have no idea. You stand in front of me, and you lecture. What does that mean you do?"

Happily for me—remember, this by now is early 1970. Women are still not in any great abundance or very welcome on ships or in field parties. It's still kind of all male. I'm a just barely eighteen-year-old freshman girl arts major, so it would have been pretty easy for someone to give me the back of a hand and just banish me back to the French department, because I couldn't possibly begin to understand. Happily, I picked the right guy. Gary loved what he was doing. He loved sharing what he was doing, and if you asked him anything like that, however stupidly you put it, he was going to reach a hand out to you and invite you into his world.

We spent the following Saturday—I met him up at the lab building—and we spent hours. I don't remember how many hours. He just kept asking me, "So what else? What other kinds of things interested you? What are you curious about? What did you not understand?"

I'd pick one thing or another out of my memory. I was not very organized about it. I did not come in with a list. It was all very impressionistic, but I would just ask, "Well, what about that?"

He'd pull out a map, he'd pull out a sample, or he'd get out a microscope, and we just spent the whole day wandering through what interested me and how he could feed that. At the end of that conversation I sort of dimly realized, "Okay, maybe this is really cool stuff, but I'm really good at languages. That I know. I'm sort of unusually good at languages, so maybe what I've found here is something that will be an absolutely favorite lifelong hobby, my avocation, not my vocation."

I said to him, "Okay, how can I test this? Are there some courses, the substantive ones, something in the major so I could find out if I could actually be any good at this, because maybe I should just put this in the hobby category and keep on the path that I'm on." There's no point in aiming yourself towards a career path on a weak point. You're going to find enough weak points even in your strong suit, so you don't go stacking up on yourself.

He recommended a couple of courses, and I came back the next year. Went through bouts of uncertainty in the intervening summer. The path wasn't really clear yet. It was an extended period of ambiguity. I figured I had a pretty good game plan for how to use my course selection for the first two sophomore quarters as an experiment about which way I wanted to go.

At the same time all this had been happening on the sciences side, I'd also begun getting a clearer picture of what might actually be the things I could do work-wise if I do continued on

with the language theme. In the early 1970s, US business wasn't anything as international or global as it is now. It seemed to me that there was translating and interpreting, and there was Foreign Service. There was probably some array of academic teaching or research, and maybe something in business, but that's so remote from our family's background and from anything that was really prevalent at Santa Cruz. That was a very distant prospect.

I figured I would take the course Gary recommended, which was an optics and crystallography course, to see if I could climb the ladder on the science side of things, and I decided to take an international economics course, which was a good direction if I was going to go into languages, and would give me a little more sense of what might be the translating, interpreting, Foreign Service world. So I set off to do both of those early in sophomore year.

I was hoping one of those profs would tell me I was no good at something. "Not your strong point. Why don't you try the other direction?" That would have eased my decision. I did fine at both of them, and in fact, got letters from each professor saying basically, "Can we please have you in our major?" They didn't help on that score; they didn't help narrow the ground.

It was a good exercise anyway and for a couple of reasons. Probably from a confidence-building point of view, I had not traded away all of the science electives in high school to make room for more language, but I had traded some, especially senior year. I had not taken pre-calculus. I had not taken trigonometry. Those are pretty key to optics and crystallography, so I basically had to teach myself Trig 101 while learning the optics and crystallography to pass the course. I still to this day have never had a formal trig course, and I won't make great claims for how fluent I ever became, in that branch of math, but I became more than fluent enough to pass the class and handle all of that.

The first day in that class the prof gets up and writes on the blackboard a really simple expression called Snell's Law, which is the angle of incidence, the angle of refraction in light, $\sin x$ over $\sin y$. I wrote all that down, but I might as well have been copying hieroglyphics. I had no idea what he was talking about. I wasn't sure if he said s-i-n, sin or sign in this context, till he said it. It was like writing down Greek. Then he turns from the blackboard, and he says, "Well, this simple expression, with which I'm sure you're all familiar, will be the basis of everything we do this term."

I'm sitting there going, "Not a clue." Raced off and found his textbook at the bookstore, then also went to the CliffsNotes section and found the *Teach Yourself Trig in Three Easy Lessons* book and plowed through both of those.

On the other side of the coin, I came to recognize a couple of things through more talk with upper division students who were heading towards Foreign Service and talking with the profs and taking that econ [economics] course. One was it seemed to me that the likely places I would end up if I went down the language path would more than likely resemble translating and interpreting.

That sounded like a fun challenge, but at one point I finally realized if you're the interpreter, it's a critical role for lots of things, but what you're doing, someone on this side has an idea that needs to be communicated, and someone on this side needs to understand it. You're taking the idea from one person and handing it to the other, and then taking it back and handing it back. It's very important, but your role is not have the ideas. You're not the originator of ideas. You're facilitating.

The science side of things is all about originating ideas. Somewhere in all of that conscious thought and vaguer subconscious processing, I realized I wanted to be one of the

people who had the ideas. I want the ideas I have to matter, not just to be an aside. So that was one dividing point.

Another dividing point was basically just a picture, now an image that I could form, of what does my life look like? What does my life look like as a function of which of these I choose? I could look at my econ prof. He's a great guy. I loved the course. It was really fun, but his world was a nice little office lined with books, his pipe, his dog, reading, thinking. All great, but stable, static, centered, anchored, quiet.

Todd Newberry, Gary Griggs, and everybody else I'd seen in that world, their world was the planet. Their world of work was the entire planet, not a cluster of books and a small set of ideas. So on the lifestyle choice, that basically made my decision. These are the kind of people I want to be with, and this is the kind of pattern I want to have with my life, so I'm going that direction. So that's how the science shift happened.

It wasn't the only time that I stumbled into a course and had to do three things at once to get through the course. I didn't follow the normal sequence. I ended up taking the mandatory freshman physics and freshman calculus when I was a senior, after having already passed a geophysics course and a thermodynamics/physical chemistry for geologists that included both seniors and first-year graduate students. Had just really gut-balled my way through both of those but had to check the square and pass freshman physics. I had been taking French and German in freshman year. I didn't take freshman physics and calculus. I wasn't going down the science road then, so I took both of those things senior year.

The only exam I ever flunked was a freshman calculus exam, because I just found the whole freshman course approach to teaching calculus so idiotic and just so boring. It was memorize rules and parrot back limits theory. I viscerally understood calculus and what it could

do for you, and these guys just wanted you to parrot back limit theory. I was annoyed. I was being haughty and snotty. I thought, “You’ve got to be kidding me. This is just ridiculous. This is beneath me.” It was so beneath me I flunked the midterm, because I didn’t care; I was too bored to care.

ROSS-NAZZAL: How did you determine you wanted to go on to graduate school? Do you have to have a graduate degree if you’re going in oceanography to be able to find a job?

SULLIVAN: Generally, it is the case that an advanced degree is necessary. As environmental sciences blossomed into the field it is now, which began in the seventies, I think the employment answer today would be different than it was at my time. For me the real driver was not employment. I’ve never been very good at having the question, “Where do I get a job?” be the primary driver.

I had always, always, always wanted to study abroad in college. In fact, if you reach all the way back to eighth grade, I was never a bad student with crummy grades, because I loved learning and am very naturally and abundantly curious. I got the grades that I got by just going along till about eighth grade. In eighth grade they had us go through a guidance course that was meant to paint the picture of life beyond middle school and give you a sense of high school as a bridge to something else, in hopes that you would actually be a bit intentional about high school and not quite so lost. Part of what they did was paint a picture of college, attending a university, what it takes to be accepted, and what sorts of capabilities that will give you.

I discovered in that course a little brochure about a junior year abroad program, a tiny little thing. This program had campuses in France—a country I was already intrigued with—

Italy, Switzerland, the European countries that for various reasons had hit my interest screen and somehow had a bit of romantic attraction for me at that age. You got to live there, and it was structured so that there was already an equivalency established between courses you would take there and courses at home. You weren't going to cost yourself an extra academic year at a university. The fees were all leveled and agreed so that you paid home school fees. So for no real change in the cost of your college education, except for maybe an airplane ticket, you could go live in another country for a year.

Our family was pretty clear about college. "We will make college education something we think both of you should have. It's going to be your choice, but the family will provide a college education. We'll get it done one way or another." As a given I can go to college if I want to go to college, and now I saw this.

This was the first way I spotted that I could actually get to go live in another country, and I was sold. Turned the brochure over; read the instructions on what it takes to get into this college and said, "Okay, that's what I want to do." Well, it turns out the brochure was from Stanford [University, Stanford, California], so of course it was 4-point-something GPA [Grade Point Average]. It was a very high standard. What registered to me was, "This is what it takes to get into the caliber of school that would give me this kind of opportunity. That's what I want to do." My grades bumped up to not quite 4.0 but close, because I now saw direct correspondence between the work I put each day into classroom learning, and the option I would have to choose a college that would let me do this. It was a straight linear path, and I was unswayable. This was going to happen.

I was so never going to go to Stanford. Our family's economics wouldn't have worked. I was not at all into the sort of class presidency and high school clubs that often counts for a lot

in admissions. Happily, no one ever told me. I don't know if I ever mentioned to someone that it was Stanford's brochure, but happily, no one ever told me, "Give it up, girl. You're never going to Stanford."

So that sort of standard-of-achievement beacon stayed on my horizon and drove everything through high school and drove a lot of what my decision was around college. The last couple of choices about which college to go to had a lot to do with an education abroad program. Despite changing majors and being a little intimidated about packing a four-year major into what was almost three, I was still going to go. I went to the University of Bergen in Norway for the 1971 and '72 school year, including both of the summers bookending that.

That was right around the time that the whole plate tectonics revolution was beginning. It was in the professional literature. I think the first papers were like 1968, '69, so it had just been building in the professional literature. It was just beginning to be visible and have an impact on undergraduate curriculum, and that was lagging behind in the classic education systems of Europe, but I got a taste of it. The North Atlantic, right off our doorstep, was the region of the oceans where this all first started to become decoded, so that was pretty intriguing.

I came back from the Norway experience really bent towards earning an advanced degree in oceanography as opposed to general geology, with a bit of a picture in my mind of research oceanography as the thing I wanted to do. Now you can see a sort of a thread all the way back to my early taste of adventure and delight in finding little things that would click into focus and I understood them.

Plate tectonics is happening; there's this whole new decoding of the world and how it works. It's happening right now, right out there. It's that kind of adventure, and how cool would it be to be one of the people that dives into that adventure and poses some of the questions.

Come up with a worthwhile question, you pose the question, and you develop the capabilities to build answers to that question. That's a contribution to how the world understands itself. That whole thing was just really appealing. That's where the thought of graduate school and becoming a research oceanographer took root was while I was in Norway.

Came back and finished up senior year with these little detours through freshman physics and chemistry, and I started applying to graduate schools, mainly in the field of marine geology. On the West Coast I applied to the University of Alaska [Fairbanks, Alaska] and Oregon State [University, Corvallis, Oregon]. On the East Coast I applied to Princeton [University, Princeton, New Jersey]; that was largely the influence of another geology prof who had been to Princeton. He knew my work was of that caliber and figured, "You may as well go get a Princeton PhD. It will carry you real far." I also applied to Dalhousie University in [Halifax] Nova Scotia, because I had read a number of papers by Dalhousie folks who were working on North Atlantic plate tectonics, and that was very intriguing.

Got into all of them, so that did not exactly help. Actually, I got into all but Dalhousie at first. Their process was just kind of lagging behind, so I actually accepted the offer from Oregon State. The normal thing in scientific grad [graduate] school is you get an award with a research fellowship that's going to basically pay for school, so you're not falling behind economically. I had one of those with Oregon State. They had a very good group. They were doing a lot of interesting things in the Pacific.

Three weeks later, I heard from Dalhousie. I also was accepted there with a fellowship, and by the way, if I was interested, they'd be glad to have me come up in the summer. They had some equipment testing research work to do on one of their vessels up between Iceland and Greenland, if I wanted to go to sea for the summer.

Well, that worked, and Nova Scotia struck me as a much more intriguing place to get to experience a different lifestyle or place of life. Grad school is like an experiment in living. You might spend the rest of your life in the place you attend grad school, but that's not always the case. For four to five years you to get to live somewhere, try it on for size, see what someplace novel is like, and that impetus was still real strong in me. Nova Scotia struck me as much more intriguing than Corvallis, Oregon, and so I called the Oregon State guys, asked if they would release me from my commitment, and went off to Dalhousie.

Then I was at Dalhousie merrily chugging away, mapping a portion of the sea floor and hoping that someday I could get down in the little Alvin submersible. While I was in grad school, Alvin started to be used by the marine geology community to try to understand in detail the volcanic processes that make the ocean crust and are so central in sea floor spreading. I was out on one of the first cruises in the Atlantic that did that research, but I was way too junior to be anywhere near getting in the submarine. I was way too junior; we got all the scut jobs.

It was pretty cool; it was pretty neat to be out there. My specific aspiration through all of graduate school was to get into something like Alvin, be able to actually go down and see the deep-sea floor myself, do the volcanology part of marine geology and geophysics, and get to dive. That's what I was heading toward and aiming everything towards until NASA came along.

Now, remember, I'm in grad school in Canada, and NASA hires American citizens. So we were not exactly inundated with advertisements about the United States' Space Shuttle astronaut selection. In fact, I didn't know about it at all until I went home to California to visit family at Christmas in 1976. My brother, the avid pilot, has been all over this astronaut selection application and process. He's been following every single piece of it. He's a highly rated pilot. He's been a bizjet pilot, and I think he may have already had some airline experience. He's got

thousands of flight hours already, an engineering degree from UC San Diego, and he has already applied. He applied both as a mission specialist and as a pilot to increase his chances.

He starts pestering me through this holiday about applying. “You should try. They say they want women and minorities to apply, and how many twenty-six-year-old female PhDs can there be in the world? You should give this a try.”

My head at that time was still just on the oceanography side of things, and so I blew him off. “I’m working in 14,000 feet of water depth. It’s already hard enough to understand the bottom of the ocean from a surface ship, and now you want me to go 200 miles above that! This is not what you do to further understand the bottom of the ocean.”

We jostled and teased about the application a lot while I was at home, and I went back to Nova Scotia, dismissing it. Within a week or so I saw one of NASA’s own small ads about the recruitment in one of the US science publications that the library received. When I read that, a different gear clicked. I recognized a strong parallel between the mission specialist role, as they described it, and the oceanographic expeditions.

I had been on oceanographic expeditions since senior year of college. It was a little different. On an oceanographic expedition there’s the folks that live and are attached to the ship, known as the ship’s company that include a ship’s engineer, a chief navigator, and skipper and so on. Then there’s a scientific party that comes aboard for as few as two or three weeks and sometimes four, five, six weeks.

The way you get the science done is by just by relationship building between the science party and the ship’s folks. Sometimes those are very transactional; sometimes they grow. I’d seen a lot of differences in how that gets done, but I understood that role. I understood that balance and that blend. You have to understand the ship, how she handles, how she needs to

respond in different sea states. You have to understand all that. It's better if you understand that as a scientist, because you're going to be much more fluent and able to anticipate how to get your work done despite whatever sea state conditions you encounter.

In the mission specialist case, they were drawing those lines a little differently, as I interpreted it. Mission specialists were going to be ship's company, so you were going to straddle that boundary. Instead of just knowing the ship and not knowing the science at all, we were going to be part of the interface; we would be conversant with the science, able to speak that lingo, but much more deeply trained in the ship itself than the typical oceanographic chief scientist is.

That all really appealed to me. What I loved most about being a research oceanographer was going to sea, especially the operational part: planning the expedition, figuring out how to work the ship, figuring out how to adapt to everything that happens while you're at sea and still come back with the data that you needed, and the accuracy that you needed. I loved that challenge. Then you've got to work up the data and write the papers as sort of penance to be able to go out to sea again the next year.

I took this now as, "Hey, I could jump over and be ship's company." Let me put it this way, as I was making my decision whether to apply or not, I asked myself to think about this career path. "If you get to go down this path, assume you're closing the door forever on further work as a research oceanographer. Try that on for size. Are you really okay with the concept that this is where the path stops as a research oceanographer?" I can't see much of what lies down this other path, so I had to imagine some of it.

But the question really, to me, became was I confident—I could describe in some detail the opportunities that would close down the oceanography path, but I had much less ability to

anticipate what would open on the NASA path. What confidence did I have that the space program would have a rich array of opportunities, rich in number, and intriguing and challenging to my skills and my interests? It was an apples and oranges balance.

If, on balance, it really intrigues you, you're confident about what you can bring to the table, and there's good running room—even if you can't see all the details—that's how you have to make the call. And presume you're going in for at least ten years, because it can't make any sense otherwise. It's clearly not a short-shot kind of thing. It can't possibly make sense to imagine that you're going to have contributed or benefited professionally and personally in something like the Shuttle Program in less than about ten years.

So that closes the research door. You're probably not ever coming back and being a research guy again. “Does that feel okay? Do you like what you can sense?” I can see things down this road; I can only sense things down that other road. That made good sense and on that balance, I tossed my hat in the ring.

Then there's the numbers, which I didn't have a real quantitative sense of until after we were selected. You've got to reckon there's going to be lots of people apply and the reality is, just on the numbers, that they're going to tell most people no. The worst that can happen is that you're going to be one of them. They're going to tell you no, and then you go on and do the research oceanography.

I had an Alvin-diving postdoc [post-doctoral position] in my hands, so I wasn't going to lose. Two fabulous things were in front of me, either of which just seemed tremendous things to get to be involved in. It made my mother a little crazy that I was either going 10,000 feet down in the ocean or 200 miles up off of the planet, and there was nothing exciting on the surface, but she quickly got over that.

ROSS-NAZZAL: How much did you know about the Space Shuttle when you applied?

SULLIVAN: Basically zero. I really didn't know anything. I had been in Canada for almost five years, four years at that point in time, immersed in oceanography. I could tell you all about deep-sea robotics, the Alvin submersible, and new technologies that were coming there and in seismic profiling equipment. I could tell you all that, because that was the toolkit that I was mastering and planning on making my trade with.

ROSS-NAZZAL: Why don't you tell us about the application process and then the interview itself.

SULLIVAN: [Laughs] That was quite a blur for me; maybe this is just another artifact of living beyond the periphery of the circles where it was being kept alive. I saw that little ad that finally helped me draw the parallel with expedition operations, clipped it out or whatever one did, dutifully sent off this little postcard that said, "Hey, yes, I'd like to look into this."

I recall that if you sent the first inquiry in, they sent you back a postcard or short communiqué that basically read, "This is just to make really sure that you're really sure," and listed a few more of the medical requirements and other things. It clearly was a, "Really, please don't bother us if you don't fit this description. Think about it again."

If you thought about it again and either were going to ignore the conditions or knew that you passed them, then you sent another card in, and wrote, "No, no, really, I would like an application package." Then you got the big old giant application package. The bulk of the application package is a Mark-1 standard US government civil service form, thorough,

comprehensive. At some other levels, especially being a grad student in Canada at this point in time, I remember just being bemused and bewildered by parts of it.

“List all the places you have lived. Start with the most current. Go back to 1935.” I’m going, “Okay, how do I answer 1935 up to 1951?” my year of birth. You know, it could be kind of fun to make up an answer for 1935 to 1951. “I wonder what they would do?” So I filled all of that out. I’m twenty-five years old, in grad school, and living on zero budget. No budget, borderline no bank account, a fellowship, and they’re asking questions that I didn’t even know existed in the world about benefits and insurance. Who knows? Nobody ever told me you should track all this stuff, like the zip code of the place you lived when you were six. I mean, who knows this stuff? You could make a living just being prepared to answer these kind of questions. So that was all just a little bizarre.

Fired it off probably somewhere in January or February of 1977 and promptly fell back into trying to complete my fieldwork. I have another cruise to do; I’m doing all the data analysis together. So I’m in the converging phase of pulling my PhD dissertation together, which is fairly all-absorbing, and putting out feelers for postdocs and the other avenues that one pursues to have some gainful employ when you finish your degree.

That just all goes along until about something around about September, October, when I get a phone call from Bill [William B. F.] Ryan down at Columbia University at Lamont Doherty Geological Observatory [New York, New York]; it’s now called the Lamont-Doherty Earth Observatory. Bill was one of the sea floor geology authors whose work I had read in detail, and I had applied to have a postdoc with him at Lamont, doing deep-sea marine geology, including Alvin dives.

He calls me up and says, “Hey, are you going to take my postdoc? I’m getting to where I need an answer. You’re my top pick. Are you taking this postdoc?”

I said, “Oh. Oh, yes. Well, probably?”

“Have you got something else?”

“Well, no, I don’t have another postdoc, but there is this one thing; I just haven’t heard anything. I put my hat in the ring for this NASA thing, and that’s the only outlier. There’s nothing else outstanding except that, but I haven’t heard anything from them.”

Turned out Bill Ryan applied to the 1967 astronaut selection where the group that became known as the XS-11 [pronounced excess-11] was chosen. He was one of the science candidates. So he had a little sense of the process, probably more sense of it, frankly, at that point than I had. He didn’t make the cut, had gone back to New York, and built a fabulous career. In retrospect, he was just as glad that his path had taken the turn that it had. It gave him a certain sympathy for my circumstance, and importantly, it really gave him an empathy for the importance of playing this all the way through.

We had a good conversation. He told me his story. He was one of the people who also just put the marker clearly on the table, and he said, “You do understand that the numbers are astronomical, and the probabilities are vanishingly small. In all likelihood you’re going to come take my postdoc.”

I agreed. I said that was fine with me. I thought it was a fabulous opportunity, but could he wait? I hadn’t heard anything at all from NASA. Could he give me some time to pull the string and see what was going on.

He said, “Absolutely. Come this direction because you know the other answer. Don’t walk away from it.”

I rummaged back through whatever papers I had and found a Houston [Texas] phone number and called somebody up and said, “Hi.” I don’t recall who it was; it might have been Duane [L.] Ross, head of the Astronaut Selection Office, probably most likely someone in that office. The first thing they said to me, I think, was, “Oh, haven’t we told you no yet?”

I said, “You haven’t told me anything yet.” Their heads are absorbed with the people they’re bringing down for interview. My name didn’t ring a bell, so I think they presumed I was someone they had already turned down calling back to pester. I said, “You haven’t told me anything.”

“Oh, let me go look,” and they go off and rummage through files and come back, and confirm that, “Oh, well, actually, yes, you’re going to be invited for an interview.” They don’t look at too many Earth scientists even today. They’ve got enough test pilots to make up full blocks, twenty folks at a time. They’ve got enough MDs to make up full groups of MDs. I was back in the tail of the pack in what probably was called the cats and dogs group, the test pilots whose schedules didn’t fit any of the other windows, the one mathematician or oddball space scientist, and this girl geologist from Nova Scotia.

So I called Ryan back and told him that, and we again commiserated about the numbers and the likelihood, and I said that was fine. They had said they would have the selection completed by the end of the year. Could he wait that long to let me see how it plays out? He said sure. He could do that. The interviewee packet arrived not long after that phone call, and off I went down to Houston.

I was making really good money on the fellowship that I had. I think I was grossing \$6,000 a year Canadian, which is \$3,500 a year, \$4,000 a year American. Not much. If I had \$300 in the bank account, I bought an airline ticket and went exploring somewhere. Like grad

students do—you're living in two pairs of cords, one pair of shorts, a blouse, and two sweaters, maybe.

So I go off to Houston. I'd been to Houston once before. I had an aunt that lived there when I was a teenager. It's all very alien, and it all looks very silly and strange. It's February, so it's warmer. This is a good thing.

The week starts with a Sunday evening pre-brief at the King's Arms in the hotel just outside the gate. It's always interesting to look back on your first impressions when you're driving through the landscape to a place you later end up living and getting to know well. You are struck by how flat it is or how green it is. This is 1977, and Clear Lake City was a shadow of what it is now. You get in the little airport van, and they're driving down a freeway. That kind of makes sense. They turn off a freeway, and you see cows. It's the most bizarre route into this place, and it's really, really flat.

I settled in the hotel room and was getting changed and organized to go over to this little reception, and I turned on the evening news. I'm not positive if this was Sunday night or Monday night, but it was early. I turned the news on in the background, and I'm going about my business, and Marvin Zindler was still real big on the local news station. I have walked past the TV. I'm heading into the bathroom, and he goes into his war cry. [Imitates voice.] "I'm Marvin Zindler," in this great Texas drawl, and it stopped me in my tracks.

I came back and looked at the television at this bizarre scene and took in some of his little spot. I remember thinking, "You can't seriously be thinking of coming down and living in a place that's got this guy."

I walked into the King's Arms. There were clusters of people. I can't tell you the whole composition of that interview group anymore. Fred [Frederick D.] Gregory, who became a

classmate, was one of the very memorable ones. There clearly were some clusters of folks who knew each other from science communities or knew each other through military circles, and I felt very much an outlier. I didn't know anybody in this room.

I walked in. They were animated. It just looked like a room of people that belonged there and seemed to feel they belonged there. I felt very much out of place and thought, "It beats me; I've got no idea what any of this is."

I remember thinking, "Kath, enjoy this week a lot, because these people kind of really seem to have some sense of what the hell is going on here, and you really don't. So have a really good week, because this may be the end of the road. Enjoy it a lot."

It's kind of a blur. It's one appointment after another. Drinking from a fire hose; deliberately inscrutable in some respects, the whole sort of "good cop, bad cop" game with the psychological interviews. One or two folks deliberately planting a sense that everything about you through this whole week is part of the interview. The implication was if you're strolling aimlessly across the campus versus marching purposefully across the campus, someone will note that and write it down.

It's just all those things to try to figure out how do you react if you can't tell what matters, but you suspect everything matters, and you suspect big consequences hang in the balance. How do you behave? Do you go bonkers? Do you settle down? That was just all a little surreal.

So, you know, I can remember bits of the interviews with Terry McGuire or Dr. [Joseph D.] Atkinson. It was just sort of a get through the getting-through stuff; the crazy barbecue dinner Wednesday night. What I really remember about the interview week is that Fred Gregory and I had a ball. We fell into getting out to the gym and playing racquetball, and that was quite

fun. Stayed out playing racquetball so late one night that they secured the front gates to the Space Center, and we had to slide under the front gate on NASA Road One. We both sort of looked at each other and said, “This either makes it or breaks it,” and just slid under the fence. We made our way back over to the King’s Arms.

I finished all that and drove up to Houston Intercontinental [Airport]. Halifax was slammed with a snowstorm, so I ended up with an extra overnight there, and finally made my way back home. I got home from the interview feeling pretty settled on a couple of very simple things. I knew I could do this job. I know I could do the mission specialist job and was confident I could do it well. I knew that I had only seen nineteen of the other people who were candidates, and I hadn’t seen them in any of the quantitative stuff. I had just bumped into them.

My sense of it at that point was it’s going to be a pretty cool thing to get to do this. I would love to get to do this, but I’ve only seen nineteen other people. There are who knows how many other groups besides ours, and I have no way of knowing where I rate. I have no way of knowing how astutely, objectively, or politically the folks that make the final call are going to do it. However it falls out for me, what I hope they’re going to do is take the best ten, twenty, or thirty people they can find, and I hope I’m in that group.

That was it. I know I can do it. I know I would like to do it. I know I have no way of telling where I am on the ladder, and no realistic way of thinking I can control the final judgment. So, great, I’m going to go back and finish up my PhD and do that well. When they figure it out, they’ll figure it out, and I’ll either turn right or turn left, and either one will be pretty cool. So that’s what I did.

They had given us the understanding that they would have this all done by the end of the year, and so Christmas rolls around, and my thesis is really coming together. I spent a week or

so out with the family. That was an odd kind of floating time, because my family, of course, was much more interested in knowing more and asked me, “What’s happening?”

When I went back to Canada, nobody cared about this. My roommates had it figured out and had me figured out. We didn’t obsess about it. We just all had things going on, and we went back to life.

Go back to California, and it’s all the oddities of family visits. Everything gets concentrated in family visits, and this got very concentrated and not particularly helpfully. “Nothing we can do about it, guys. Let’s not obsess about it.”

I did take—I don’t remember how I came across this—but I took Michael Collins’ book, *Carrying the Fire*. That was my Christmas reading book, and it’s a fabulous read. I still recommend that book as best of the best to anybody who wants to have a sense of what the program is like. What does it feel like to be in it? What’s the mix of aspiration, anticipation, and anxiety and all of those kind of human characteristics of being in a high-challenge, high-competition environment? He writes well, and he’s just a neat guy.

So I read that; intrigued by it, realizing I can’t put full meaning into all of this. Struck by lots of dimensions of what he was explaining and how he was talking about it. The Christmas after my first flight, I read it again, just out of curiosity. Having been selected, been in the agency for six years, received a flight selection, been on a flight, and successfully completed the mission—to see what different things I understand or what different nuances I pick up. It’s still a favorite book.

I read that. That was the one degree of sort of indulging more thinking about what would it be like and “I wonder if, and I hope that.” It wasn’t till somewhere—I have it in my head that

it was around the second or third week of January 1978 that we finally got the calls. I've not gone back and checked the dates.

Halifax, Nova Scotia, is one hour ahead of Eastern time, and of course, they're trying to get the word out by phone to everyone before they drop a press release, so that—as it turns out—you can brace yourself for the media onslaught, not that I realized that at the time. The phone in our little apartment, which I shared with about four other grad school girls, rang at something crazy early, you know, six-thirty or seven in the morning. Our phone never rang at six-thirty or seven in the morning. It's a hallway phone, so the phone rings, and whoever was nearest by picked it up and said it was for me.

For the phone to ring for me at that hour of the morning, given where my family is, if it's family, it's a disaster. That actually didn't cross my mind, because there was nothing on the horizon; I don't know, it just didn't click. It clicked that this could be the Houston call, because I'm more of an optimist, I guess, than a worrier, so it didn't click that something bad happened. It was unusual, and the unusual thing I was waiting for was finding out what happened with the selection.

It was George [W.S.] Abbey. I know now that that means I was getting the happy call, but I had no idea who was going to call me back, if ever. So it was Mr. Abbey, and in his renowned laconic way, saying hello and asking if I remembered my time in Houston. Would I still be interested in coming down to work for NASA? You would have thought he was asking if you still were interested in working at the grocery store. It was sort of, "Just wondered if you were still interested." You know, your life is going to turn upside down in a minute, and it's just this completely low-key question.

I said, "Yes. Yes, I would. Thank you."

A few other words with George were exchanged, and then he said, “Well, I’m sure you’ll want to talk now with our HR [Human Resources] and Benefits folks.”

He might as well put me on the phone with someone who speaks Russian. I didn’t have any idea about it. I’ve never had any of this stuff. The thought that went through my head is, “I’m making 6,000 Canadian a year. I’m pretty sure you’re not going to pay me less than that, so probably none of this is really going to matter to me. It’s all going to be positive, and I don’t really think I need to worry.” I listened politely; I don’t think I understood anything the Benefits guys said. I’d just never cared about any of these details; really don’t even care much about it right now.

I listened politely, said thank you, hung up, told my roommates, and called my parents. Of course, the whole rest of the day, the phone at the lab and the phone at the house were just ringing off the hook. It was fun. It was just an exhilarating, very crazy, very wild, very fun quasi-disorienting day. It was like riding the top of a tsunami and just sort of going through the world, “Look at this! This is amazing.”

In Halifax it settled down fairly quickly after that. Number one, it’s mainly a US story. Number two, at the time Canadian media and Atlantic Province media wasn’t anything as voracious as it might be today. It wasn’t a twenty-four-hour news cycle. It was a big wave, and then the media wave kind of left me. There was a nice little buzz, but I also still had a PhD to finish up, so I had things to do.

It was something like six weeks, I think, somewhere in the February time frame that we went down to Texas. We were all invited down to Houston for the public introduction of our class. It’s always intrigued me. I remember swapping stories with some classmates; I’m always struck by how some of them have very granular, very specific recollections of events or texture

or people. That doesn't tend to be how I absorb these kind of experiences. Mine is more sort of atmospheric, impressionistic, in that, you know, I'm the 500,000-foot person. It's fascinating to get to compare them.

I made my way down to Houston. My biggest challenge and probably insecurity going down for the starting interview was realizing how we were going to be plopped up onto a very visible public stage. It was only a dim first glimmer, but based on the little dose of media that I had gotten, I realized that it's going to be a big public event. We're going to be introduced to the world. There's five other gals. There are probably people who actually have a wardrobe and are going to be there.

"Which pair of jeans am I wearing? Ooh, probably not jeans." What do you do about this? I'm twenty-seven years old, living on \$4,000 a year, not much of a wardrobe, and not much of a bank account, so the wardrobe picture is not going to change like radically overnight. Happily, Carolyn [L.] Huntoon, who was one of Chris [Christopher C.] Kraft's key folks at that time, and Ivy [F.] Hooks, I think both those two ladies both, bless their hearts, had the insight and foresight to recognize the introduction was not about appearance or clothing. At that time, three of the six women were working full-time. Judy [Judith A. Resnik, J.R.] was out in the working world and Anna [L. Fisher] was kind of in the working world; Shannon [W. Lucid] was at a university.

At least three of us were still grad students, Sally [K. Ride] and I, for sure. We were both finishing up PhDs, and I really appreciate however much Huntoon and Hooks weighed in and tried to recalibrate everyone's focus. "You've got folks who are kind of broke, and ain't focusing on this, and let's just be square here about what's really going on."

I don't remember the particulars like each being called out on the stage. I think that's what happened, but I don't have any real vivid memory of standing backstage, hearing my name, and walking out on stage like actors at the Oscars. That didn't register. There we are out onstage, and there's this click, click, quote, quote, and about two minutes later they say, "Thank you. This is the end of the formal event, and any of the astronaut candidates are now available for the rest of the day for media interviews."

We'd been told that was the deal. You walk out, you do appear as a group, and then there are media interviews. Well, you know, the six of us gals plus Fred, Ron [Ronald E. McNair], and Guy [Guion S. Bluford] plus Ellison [S.] Onizuka were odd people. There had never been critters who looked like us, admitted into the astronaut corps. I remember the conversations before we all went out there, probably some of them with Carolyn telling us gals in particular, "There's a lot of media interest. There might be some for you guys. It's going to be a long day." So I braced for that.

We eventually came to refer to our class as "ten interesting people and twenty-five standard white guys." This event was one of the things that started that, because the twenty-five standard white guys were done about 4.3 minutes after the formal event, left, and had the whole rest of the day free. They could go run. They could do whatever they wanted. The other ten of us, we were there till Lord only remembers. I don't remember what time—way late.

Again I really give credit to Carolyn Huntoon on this one, because none of the six of us gals had ever been through anything like this. Carolyn was a fabulous counselor for us. We're all very accomplished. In a certain sense there's a lot of similarity between the six of us: career-oriented, technology-oriented, smart, capable, confident, composed.

But we're also different. I mean, style, manner, personality, personal history—married, single, dating, whatever; that stuff's all different. And that's going to be a lot of what the press is trying to scratch into. The press was going to be basically starting to compose a mental model for themselves and for the US public about "who are women astronauts."

So we had a quick little, not a lengthy conversation, but just a bit of time to chat before all the interviews started, in which Carolyn helped us appreciate the issues we might be grappling with. If you are the first gal who a reporter asks about—pick anything—dating, or will you wear makeup on the Space Shuttle, any of those silly questions that the six of us would probably get—how would we respond? We'd either blow them off because we thought, "Who cares?" or we'd answer it not imagining what they would make of it. They will want to stretch that to be an answer for all time for all women, the complete image and declaration of what women astronauts are.

If one of you is more comfortable than another talking about very personal details, they will want to pry for the same level of details from everybody. However any one of you answers something, it's going to create a set of feedback loops that will affect the others. You might just want to take a moment and think and talk about the degree to which you want to each do and go your own way, or the degree that some agreements in principle between you might serve you well for today and serve in the long term well, because these are going to be the first data points.

That was really helpful. I think by and large most of us, we'd been accomplished, but we had been able to lead pretty private lives. I think most of us closely agreed that in taking a public role our professional performance and the dimensions of that are fair game to talk about or critique in public. But the color of my living room or who I like to hang out with, those kinds of things, are off limits. I'm planning on still having some private life.

We had just a little quick conversation touch. We each fanned off for our first interview, and I don't recall that we made an explicit agreement to do this, but we each went off for our first interview, and as we were about to be shepherded from interview one to interview two, we each, as I recall it, independently—or maybe somebody thought about it and it rippled through us—said, “Potty break,” and bailed into the ladies’ restroom. Most all the reporters were male, and all the PAO [Public Affairs Office] staff was male, so we could have completely private meetings in the women’s restroom.

We’d jump in there and say, “Okay, who did you have? Who did you have? Who did you have? What are they after? What do they want? How far did you go? What do you think?” We just sort of synched up after almost every one of those interviews, and I think through the course of that day gathered a sense of each other’s boundaries. We’d only just met each other, but we learned a little more about our differences, our similarities, and our boundaries. This was the first testing of whether we were inclined to share a common interest versus pursue an individual interest.

We, through especially that first year or two, would periodically get together, often with Carolyn, often as not catalyzed by her, to touch base back on the bigger issues—the dimensions of women in the astronaut corps at NASA long-term that were emerging day by day, from who we were to what we were doing, but that oftentimes you don’t see that so much, young and in it at the beginning yourself. Shannon probably had more sense of it in some respect than any of us did, because she was further on in her career and had more experience with seeing how these things all evolve.

That’s my main memory of the introductions day was bailing into the ladies’ room to have these little tag-up meetings about, “Okay, what are we going to do with this guy? This one

really wants that. Are we going to tell them that? No, we're not talking about that kind of stuff. It's none of their business. Okay. Okay, nobody goes there, right? Fair. Okay." Off we go; sort of put up a bit of a united front just by evolving it as we went through.

ROSS-NAZZAL: You've raised an interesting point, and it was something that I had thought about. I compiled some research on the 1978 class and found that there was a lot of interest in the six of you. After you were selected, there were a number of articles published. There were a lot articles about [Margaret] Rhea Seddon when she married "Hoot" [Robert L.] Gibson, and Anna Fisher and her husband, how she was selected and he wasn't, and then when he was selected, how she was going to be boss. How did all of that media interest affect you? Were there a lot of media coming to your house, or were there a lot of requests for interviews with you in particular?

SULLIVAN: There were lots of media requests for all of us. It never for me became being chased to the house. It was the first time in my life I had a personal private phone of my own. I went ahead and got an unlisted number just as a bit of protection against that kind of thing. But no, for me, it never turned into being chased around to the house.

The media struck me as to some degree pretty predictable. I don't think this was all that consciously formulated; it kind of emerged, sprung fully formed into my consciousness. When I met everybody and looked at our six women, my own assessment, on what's the media going to do, they're going to follow the stereotypes they normally do.

They've got a cute blonde. They've got a cute kind of curly-haired, flirtatious, single gal. They've got two married gals, and of the two of them, Anna was slighter of build, younger.

Rhea, Anna, and Judy are going to be their lightning rods and their icons. They're very telegenic, photogenic. Sally might get in there; she fits the physiological stereotype, you know, slender.

Shannon and I are taller, stockier. Shannon's married. If you were going to line the six of us up, put our six photos up, and pick cover girl shots, I'm not a cover girl type. I've been on covers, but I'm not an archetypal cover girl look or face; neither is Shannon. The other four are closer to what I reckoned the typical lens would be on. Who do you want to put on the cover that will signal the things that you're trying to emphasize to sell a magazine?

I pretty quickly said, "I'm not real likely to be one that's going to have everybody chasing me, because these four women outwardly look more obviously like the stories they want to chase." Apart from the marriage milestones, you might get a different answer from someone like from Rhea or J. R., if she was still around. You know, Rhea shows up, blonde surgeon driving a red Corvette. Bam, there you go. Okay, let's guess who will get the attention.

It's about fitting the mental models that the writers or the reporters have, and I've never really fit very well into people's standard bins. I sort of formed that assessment. I reckon I'm not real likely to sit in anybody's standard bin. Too tomboy, too smart, too strong, too all those things; not the archetypal little girl.

ROSS-NAZZAL: You mentioned meeting with Carolyn and some of the other female astronauts. What were some of the issues that you tended to discuss on a regular basis, and how often were those meetings held?

SULLIVAN: They were sort of irregular. They were more episodic than regular, especially in our first year. You're going through training and courses and study together. Our group was big enough they split us into two cohorts, but you're basically going through the same general syllabus together. If you're on the road, you're probably on the road as a class doing the site visits at different NASA centers. Once you get to the end of that year, everybody gets farmed out to more individual work assignments and professional development assignments, so your calendars fragment completely, and now you're going a hundred different ways. We probably got together four or five times, maybe six times that first year.

It was not always issue-generated as much as it was just building the professional acquaintance of staying in touch with each other, being a little bit aware of what's going on at NASA. Every now and then Carolyn would have something to raise, because she was working at the senior management level. So every now and then she'd alert us to something. I don't recall particulars, because they were not really momentous, big, you know, "You six must make a decision," kind of things. It was a place for us to, to some degree, vent and share experiences with each other.

Lots of the guys, not all of them—some of them had scientific backgrounds—but, lots of the guys came out of the military squadron tradition. They'd go off drinking and have happy hour together. They'd change in the locker room at the airport together. They'd change in the locker room at the gym together. There was enough of them, and all the rest of the astronaut corps was male, so they had locker room time to maybe see Gordon [Charles G.] Fullerton and maybe see Dick [Richard H.] Truly in a very unstructured moment, maybe do one of those coffeepot or locker room exchanges where a lot of information exchange happens in an unstructured way.

There were only six of us. That's hardly critical mass. I was a pretty consistent gym rat; not everybody was. I think the main thing Carolyn was trying to do was foster some of that networking for us, because we otherwise weren't going to really have any network. Most everybody you were working with on the Center was male. It's going to be challenging enough to have a little cohort of six in a population that just became something like sixty. I think there were two dozen astronauts when we arrived, and we were thirty-five, so I think we rounded the number up to something on the order of sixty.

Not quite 10 percent of that cohort is female. They don't know each other from before at all. They've only just met a couple of weeks ago. Completely different backgrounds; from twenty-six to thirty-nine in age span, and how can I help develop some cohesion among them? Everybody in the astronaut corps at one level is a colleague and a quasi family member, a squadron mate, and at another level is a peer competitor. So you've got that dynamic going on. We all know this. The stereotypes of individual women in highly competitive environments—one of the stereotypes is they're not good mentors or collaborators with the other women early on. It takes a certain critical mass.

I've never actually asked Carolyn if her main intention was to catalyze some networking among us, but it seemed to me that she was trying to do just that, because of her own perspective on the importance of it. With our respect for her and her seniority, if she suggested it, we would convene. We might well not otherwise convene ourselves.

We didn't want to become "the girl astronauts," distinct and separate from the guys. None of us had ever followed that model. I don't think any of us in our prior professional life had taken the path of being the girl *x*, the girl *y*, joining all-female groups. All of us had been

interested in places that were not highly female, and just wanted to succeed in the environment, at the tasks, and at all the other dimensions of the challenge.

I think she was just trying to give us that initial cohesion. I think she probably in some ways realized more than we did how important unity was on some level. It won't matter on everything, but it will be highly important on some other things, and only if you get a little bit of that initial sense of relationship going can you take on some of these systemic issues that might come up. I can't think of any real pointed issue that emerged after our first year or so.

Well, I take it back. There were one or two little things, and I think that bit of cohesion and that sense of there is something that affects all of us here helped. One of the ones that I encountered was the first time I was assigned to work in what's called the Cape Crusader role. Cape Crusaders are support crew members that look after the prime crew's interests on vehicle integration on testing and preparation so that they can focus on the training. On launch day, you can tell them, "Strap in. It's ready to go. So say we, your colleagues and buddies who have been keeping an eye on everything and checking it out." Pretty fun job.

I was the first gal in our class to be assigned this task. I guess our class had one cycle before that, so El Onizuka, I remember, had been a Cape Crusader in like the second round of assignments, so it was like STS-3. Dan [Daniel C.] Brandenstein, I think, and me and Loren [J.] Shriver were new kids assigned to be Cape Crusaders. At the time, a lease had been taken on a three-bedroom condo [condominium] down on the beach, and that's where the Cape Crusaders stay, so you could leave some clothes, you could leave toiletries, and just fly back and forth.

There were rarely more than two or three guys there at a time. Each guy would take his own bedroom, drive out, and work on site. It was more pleasant than staying in the crew quarters, which is miles away from everywhere. If a fourth or fifth guy came, they'd hoof it out

to the crew quarters or stay at a hotel. So it was first come, first served, take a bedroom at the condo, off you go.

I get assigned, and Don [Donald E.] Williams, I think, was going to be our group lead. He's another classmate. I went around to see Don and said, "I need the key to the condo." I had something coming up, and I needed to be down at the Cape [Canaveral, Florida].

Don starts very nervously into this back-pedaling of, "Well, actually, you know, I've been thinking about this," and the essence of what he was thinking about was he was really nervous about the prospect of a three-bedroom condo with not all guys in it but a woman in it. "What will people say? I don't know. Ooh, I don't know if we want to do this."

My manner is not punch somebody in the nose right away, so I heard him out. I replied, "I think what people will say and how long it will take to get anybody past it is completely a function of how we handle it and what we say we're about. I'm about getting down to the Cape and doing my work. That's the thing we need to do, so I think how we handle it is entirely in our hands. I think we just need to saddle up and go do it."

"Well, let me think about that."

So I passed the word among the other gals, and they rolled in on him. We just did a little "good cop, bad cop" thing. I was going to have to work with this guy. They rolled in and asked, "What are you going to tell your wife when I'm assigned to a crew with you? If we can't handle this, if we don't understand what this is and how we're going to handle it, how will we handle flights? I don't think the media gets a vote. There aren't enough women to make up a crew, so it won't be an all-female crew. I don't think your wife gets a vote on flight assignments. You're crazy. You've just got to get over this."

My strategy was, “I’m going to go get a key from one of the guys who’s already been there. I’m the first guy in our new group that’s got something to do at the Cape. I’ll go down. I’ll get settled in the condo. When one of the other guys shows up, I’ll tell him, ‘You’ve got to go sort that out with Don because he has decided that we just really can’t have mixed gender in the condo, and I’m already here. So you’d better just go. Not my problem.’”

It was a bit of a pincer strategy, and it took him about a day to realize that this was not a tenable position. He got over it. So we sort of helped each other out there.

When Sally was getting ready for STS-7 and they had bench check coming up where you go look at all your personal equipment stuff, it was another time that I think she recognized we needed some agreement on an issue. They had a personal hygiene kit that contained the basic toiletries kit and for the women, if we wanted, they designed another kit that had makeup and other more female items in it. This was the first time a female astronaut came over to do a bench review on all these pack-out items. She patrolled the hallways to grab one of us and be sure there was a second view, a second voice, a second awareness, not have it all pivot on just one viewpoint. I ended up being the gal who was around, so I went over with her.

We would do things like that. “I’m going to get asked xyz. It’s going to cut this way. They’re going to take this as everybody is in agreement. I need to talk to you guys about it.”

Later, I drew a spacesuit assignment, which tackled the issue of, “How are we going to solve the urination problem for women in a pressure suit?” We were not launching in pressure suits at that time. We were launching in shirt-sleeve clothes. The EVA [Extravehicular Activity] suit proved to be an engineering challenge as no women had ever been in the corps before and therefore outfitted in the suit. The men peed into a cuff. When we arrived, they realized, “Oh that’s right. Women are in the group that does spacewalks. The cuff isn’t going to

work for them.” Of course, they realized it might be a good thing to include one of us in the discussions.

We would keep folks informed. Most all of the calls that I would make were really straightforward, and there was no question in my mind that there was a sound answer here; there was not really much personal variability around it. They imagined they were going to create a form-fitting device for women (since a form-fitting device worked so well for men, except when it leaked, which was often.) The other easy option was diapers which they (all males) couldn't imagine asking a macho male astro to wear. The form-fit idea was a disaster, of course, and we all ended up using diapers in the end.

I think we all were pretty alert and not playing games with those cases where there might be some variation that actually mattered to one of these other folks. If we thought there was, we'd say, (a) let me find out, and (b) if there is, let me make the input in a way that sets up that full range as sensible, normal, and what the system needs to provide. Because if I come in and say, “Exactly. That one's perfectly fine forever,” and you come along two flights later needing something different, what the system is going to do is say, “I told you we shouldn't let women in, because we had an answer and it worked, and then every one of them comes along, and wants to make it different.”

The guys tweak stuff all the time, but that's the norm and it's not commented upon. When it's a new group, a new cohort, a new identity, all those little things can become cited as points of difference and cited as arguments as proof that this isn't working. “They don't get it. They can't just take a standard and live with it.” Is it accurate? No. Is it equitable? No. Is it evenhanded? No. But it is part of what happens when you're shifting the makeup of the group.

We did a pretty good job, on the whole, I think of watching out for that and watching out for each other on it.

ROSS-NAZZAL: What impact do you think that the six of you had on the selection, the careers, and the experiences of other women who were selected later on, like Eileen [M.] Collins and some of the other women who have gone on to be Shuttle pilots and commanders?

SULLIVAN: I think of someone like Susan [J.] Helms and her 1990 class and more junior women selected as astronauts. Our arrival on the scene was a huge encouragement and motivation. It ought to not be the case that we only take inspiration or learn from a human being who looks just like us, but the fact of the matter is that it's a quicker path. If I see someone just like me doing something, it's a quicker intuitive path to recognize that, "Oh, I could probably try that." So that sort of sounds subtle, but in some respects it's kind of a pervasive impact. The door has already been cracked open.

I've told you my story about school and college, not really being aware of what the structure of work is and what are the doors I might consider wanting to walk through when I finish college or finish grad school. Who knows? If I had watched Jane Smith walk out to the launch pad in a Mercury flight or an Apollo flight, maybe it would have registered differently to me that that could be one of the things I could do.

I think that probably matters a lot in a systemic fashion, in motivation, and inspiration, the ability to imagine that you could go do that. It probably adjusted a number of young gals' academic paths or sense of how to go about that.

You know, I'd give us six good marks on both personally and professionally, technically, how we carried off. I mean, we got the assignment to carry a banner, and in different respects different bits of it fell to each of us along the way. Sally got the nod to carry it first up into orbit. I think any of the six of us would have succeeded at that and done fine at it, but having said that, the ball came to Sally, and I think Sally played that one very, very well. Nothing came out of STS-7 that steepened the hill for any of the other five of us coming behind, and I don't think any of the other five of us did anything other than help flatten the hill for gals who came behind us.

The other big thing that's happening in the time frame that the six of us are there is that the astronaut corps itself, all male beforehand, is starting to change in other ways besides gender. When our class arrived, the astronaut corps really had to triangulate around civilian scientists and triangulate around women and minorities. All of those were provocative forces in varying degrees.

If you read Mike [Richard M.] Mullane's book [*Riding Rockets: The Outrageous Tales of a Space Shuttle Astronaut*], you get the sense from him that it was the unwashed, unproven, you know, soft-skinned scientists, never tested by harsh conditions, that unnerved him the most or that threatened his sense of pride in the caliber of experience. Mike's a pretty straight guy; that's probably about right.

The gender part of that was clearly also a factor. All the guys we walked into, every woman in their life, before we arrived, was wife, girlfriend, daughter, or secretary, period; occasionally a nurse. But that's it. That's all you ever were, and so whether we wanted it or not, it fell to us to change their views about women.

How we handled ourselves and how we handled joining all of that set the first tones for our peer and professional collegiality. What's the comfort and humor level? What's the distance

level? What's the balance of strength in all of those things? How does this work? How does this work as friend, as colleague, as crewmate? How does this actually work? How strong or reliable or clear are they? The other thing it was going to do was give the astronaut corps, or give the agency, the first bit of understanding of what's the difference between what it means to have women in the astronaut corps versus how an individual named Rhea Seddon goes about things, or how Kathy Sullivan goes about things—triangulating the group identity to the individual identity and capability.

It's a good thing, a wise thing—I suspect a fairly conscious thing—that our first cohort numbered at least six. We were almost one-sixth of the class, about 12 percent. I think the social science literature kind of tells you that there must be a group size of six-plus and 12 to 15 percent. If you go below that, the group of new, strange people is too few to have any kind of intrinsic group cohesion, so there can't be really any support sense that can develop, that that cohort can develop from within the like folks. If it gets below that, their different way of looking at things doesn't have enough critical mass to hold its own and start being influential in shifting the culture.

So, that was happening with all of us, and just like all the standard stereotypes—you know, the Harvard Business School, Harvard Med [Medical] School [Cambridge, Massachusetts] picks the top 10th percent, and as soon as you get there, the hundred of you that walk in get stretched out again to be the best of the hundred and the least of the hundred. The least of a hundred is a fabulous performer, but you still have an internal evaluation scheme and competitive dynamic that begins to discern those differences. So all of that was happening with our class at the same time.

I think if something had really gone badly, if one of us had really, really muffed an assignment, their personality clashed with someone, or lacked the personal strength of character to stand up to the combination of scrutiny, joshing, and public exposure, if any of that had fractured even on one of us, I don't know that it would have reversed the process, but certainly it would have probably created a deep, long detour and just left more debris for the next wave of folks to have to pick through before they could really regain the path and start making the kind of progress that we would want.

My commentary is focusing really very much on the things that seem to me to feed systemically into an organization's sense of identity and culture and its awareness of itself. There was a pretty distinct sense of identity to the astronaut corps; not always very self-aware, I would say, in its behavior, its dynamics, and how it does things, but it's a scrutinized group of people. It's got a public face and persona. It's got all the things happening politically, psychologically, organizationally, that really sort of crystallize a sense of identity that is both empowering but also confining in some ways.

We had to figure that out and make our way in it individually and also make our way in it in a fashion that kept the ground open for other women to come behind. What about an Eileen Collins? Eileen and everybody of those subsequent classes is, if I'm right, to some degree a beneficiary of the bits we were able to figure out, the foresight we were able to muster, the way we went about it, and most importantly, the way we behaved and the way we performed. I would say by the time the agency selected women pilot astronauts for the corps, a couple of things were happening, of course.

One key thing that we had nothing to do with was that society at large was also shifting, and so eventually by virtue of nothing that we did, women gained access to the test pilot school

lines in both the Air Force and the Navy. If that had not happened, I think it would have been a lot longer road for the agency to maybe reach a point of saying that that was not a pivotal, “yea or nay” credential to have. As long as that stayed a “yea or nay,” that door either needed to open or the pilot astronaut door wasn’t going to open.

But we didn’t have anything to do with that. Eileen and the gals who made their way into that realm and succeeded there—what they did in test pilot schools is a direct parallel to what I’ve been talking about. Show up and help that world learn who you are as a pilot and the fact that you’re female, where does that matter? Where does that not matter? Start to pull those pieces apart and be able to make more insightful judgments.

Eileen’s track record will get her anywhere she wants to go, and she’s proven that over and over again. The interesting question, that can’t be answered, is this: suppose that in the time frame that the world set about to select us, women already were in some numbers coming through the test pilot ranks. I’d have to check the calendars. I think there probably had been one, or a very, very small number.

The interesting question might be, what role did a number of years of being able to watch us perform and behave, what role did that play in helping the selection process make sense of someone like Eileen? And in particular, in the little bit of time you have to look at someone in an interview, you’re judging Eileen and yet you’re judging her for command, and that puts a whole different lens with a lot of both technical and cultural factors to it. You’re judging them, their composure, and their aptitude for command.

Commanding something on an easy day is fine; command means you’re still keeping it together when everything is falling apart. You’re still leading the keeping of it together and mustering everybody’s energies. That’s a real important judgment to make and to make well,

and I guess I'd like to think that elements of how we handled ourselves in the first couple of waves of flight helped paint that picture and create some of the sense by which Eileen and company were evaluated in a meaningful way and with some insight. I'd like to think that maybe some of what we did helped create a better picture for that.

But those gals walked in that door on their own right. I don't want to take anything away from that.

ROSS-NAZZAL: You mentioned Mike Mullane's book. All the women we've talked to who were astronauts said that NASA treated them very equally. Mike Mullane portrays that issue in a very different light in his book. He writes about how a lot of the men from the military side of the house like him were sexist. They didn't think the women should be included in the astronaut corps, and he describes how that changed over time, as his relationship with Judy Resnik deepened. What was your experience in the astronaut corps? Was your sense that you were treated equally or somewhere in between?

SULLIVAN: I felt treated pretty equally. I had been one of the first gals into geology field camps. I had been one of the first gals on the geology expeditions given the vehicles and driving. I had been one of the first gals at sea. So I'd been a lot of places where you're dropping into an environment that's not used to having people like you around. In these sort of operational environments, there's a habit and a pattern of a certain kind of joshing and group dynamic and teasing, hazing, that can be pretty harsh.

There is a way each one of those groups is used to making new group cohesion. I just did a five-week lecture expedition with *National Geographic* and Linblad [Expeditions], so this is

ninety folks who have self-selected as guests to go out to sea and be taken care of, looked after, and taken places. And even there you have ninety people who don't know each other at all arrive at a dock to get on a ship, and you can watch a set of processes, a set of almost sort of ritual things that kicks in, not scripted, not spoken, not agreed upon. This is a group of people who are forming themselves into a community to do something pretty intense and unique together for, in our case, thirty-six days, and unform themselves to go back to their separate places at the end.

I think that's much of what I observed and was happening when we arrived. Our class was forming itself into a community and testing and experimenting with how much of community is that going to mean. Is it going to mean all thirty-five like forged together forever? Is it going to be clumpy? You don't know; you're finding that as you do it. We're all new, so at some level, we all don't know anything. When you walk in the Space Center and they haven't had new astronauts in about nine years, everyone is kind of looking back a little bit. "Okay, who are these new guys?"

I felt, in terms of how our classmates treated us, and there was teasing and joshing—you always get teasing and joshing. People are testing in this kind of teasing environment. It's always testing for, "Can I find a button that unnerves you? Can I get a rise?" If you find it, you're going to kind of keep poking at it. I don't know, it's probably partly just personal amusement to yank somebody's chain, but it also has a purpose.

In the constructive sense there's often a, "We have to be good here, guys. We have to be really up to par here. We have to be able to get out into the airplane or out on the football field and even when it's crazy, stay composed, and get it done together. So yes, I'm going to tease you in a way that punches your buttons, because if you can't take me punching your buttons and

still retain confidence and composure about your abilities and what you're going to do, what the heck you going to do when we get up in the Shuttle and we've got an emergency? What are you going to do when we get out in an adversarial circumstance? I want to know you're someone who can keep it together and pull together with me, not someone who's going to fold because something assaults your sense of confidence. We're going into challenging environments together." I think there's some constructive intent behind some of that push-your-buttons teasing, or at least I had always come to construe it that way.

I felt like everyone around our class table genuinely believed and respected the fact that we had all passed the same screening. I didn't feel like any of those guys felt that we'd been let in free or had been let in easy. They didn't know us. They didn't understand our backgrounds. They had never kind of spent time where we had come from. But I felt like they reckoned, "You got in the same door I got in, so you get a fair shot to start out and show what you can do."

From that point on, and this is perfectly fair to me, we each are going to stand on the track record that we build. All I'm asking is don't be throwing banana peels and marbles under my feet while I'm trying to do this. If I do brilliantly, have the integrity to be able to say, "That was well done." If I stub my toe, trip, or fall, let me get up and do it again. That's fair. But don't try to trip me up just because you don't like having someone who looks like me around. Give me the same shot to actually demonstrate what I can bring to the table and how I can go about that.

I thought we were given that by our classmates. In terms of the Space Center and NASA in general, it beats me what everybody's individual opinion actually was, and who knows what the gossip at the bars or in the boys' locker room was, but we didn't walk in as a buck private, you know. We walked in carrying the title "astronaut." That would be like walking in the Navy

wearing the rank of admiral. So you might well encounter someone who is flustered by seeing you carrying that title and having that role, but in the first instance, probably in a flash they're going to be processing an important decision.

“I've never seen anyone who looks like you who carries the title 'astronaut.' Everyone I've seen that looks like you, I can dismiss them. I can flirt with them; I can dismiss them; I can ignore them, whatever I want. They're minor people, maybe—minor people in my technical life—so I'm not sure I know how to treat you. There's a way I treat people who look like you; there's a way I treat people called 'astronaut.' They have never merged before, so which way am I going to treat you? I do know that anytime I've encountered someone called 'admiral' or 'astronaut' and not treated them the way the title implies, I got my head handed to me.”

I think dynamics like that probably got us a window, a grace period from probably almost anybody, whatever their personal opinion actually was, because you just don't ever treat admirals this way. Even if the next thought in their head was, “I really doubt you're going to pull this off,” you were going to get to move first and get a little window to show what you can do.

I think the six of us stepped up in those windows well, both in personal composure, behavior, and in technical performance, and over time, at different speeds, with different people. Probably still have some skeptics out there that still to this day think the whole thing was a bad idea. By and large, I think we stepped through those doors and through those windows in ways that were positive, solid demonstrations of equal opportunity.

“I don't have to convince you about anything, just demonstrate what I'm doing. Aren't we an outfit that's about objective and observable assessment and performance, and isn't that what we were trying to do? Isn't that the proper way to do it, and wasn't this task sufficiently,

well, and properly done? I can't help you with the fact that you're a little unhappy that I delivered that performance; you would rather that I fail. I can't help you with that. That's not my problem. That's what we were trying to do, and that's done, and it's correct, then let's move on."

ROSS-NAZZAL: Let's go back and talk about some of your on-the-job training. I understand that you and Rick [Frederick H.] Hauck worked with Dick Truly for a three-month period. Do you remember that time period and what you were working on?

SULLIVAN: Yes, this was leading up to even the first Shuttle flight. We were thrown into flight data file checklists, and there were a couple of things. Rick jumped in, as I recall, and just got right in the middle of ascent-entry checklists and was doing all sorts of things. That technical assignment was bewildering to me.

I was still trying to write up one key paper from my PhD thesis. One of our other advisors, Al [Alan L.] Bean, had—and in retrospect, I don't think this was the best of advice to have taken, but Al said, "If you've got any last capstone on the work you've done before, do it now, because these first couple of months are the last time you'll be able to do that. It's all going to pick up speed through this whole year." So I was putting a fair bit of my time and effort into getting that paper done.

I had never seen this kind of checklist at all before, and I was much more tentative about my ability, my presence, and ability to order people around, to go downstairs to the second floor and say, "I need to do this. Get these guys together. I need to do this." There's a whole world down there that's doing checklists, and they're working directly with the prime crew, and I was a

bit bewildered about how to insert myself into that; I was uncertain about my authority as a brand-new baby girl astronaut.

It's the one technical assignment in all of my first couple of years that I didn't feel well oriented in. I wasn't clear how to insert myself into the administrative bureaucracy and take over a process that was so completely alien to me. When I came to the WB-57 world—that's another one of my early assignments—I got that completely. “Go be a mission commander. Get out there, do flights, plan flights.” That made perfect sense. The spacesuit assignment came not long after, and all that made perfect sense.

Oddly enough, I never felt I got really solid traction on helping to formulate the systems management checklist, and besides I was absorbed with this paper. So it was probably a really good thing they rotated me out of that in about three months. I was not a real happy camper and was probably not distinguishing myself on that assignment.

ROSS-NAZZAL: Did you move from that to work on the WB-57, or how did that come about?

SULLIVAN: I'm pretty sure, yes, pretty sure that was the sequence. It was later that I came back around and did eventually work systems management software on the change control side of things.

This was sort of the out of the blue George Abbey called up and grabbed “Pinky” [George D.] Nelson and me and said, “You guys are going to go work the WB-57 High Altitude Aircraft Program.” I never really talked with Pinky about it. It's neat to get to go fly in an airplane, but certainly I worried and wrestled with the assignment. It's the classic thing; you feel

like you're being farmed out to something a little peripheral. You're not going to be around. All the guys that are doing STS-1 and STS-2, that sure seems to be where the feeding frenzy is.

“What is this? Is this a good assignment? Is there a positive here? Is there an intention behind it that I'm really happy to have behind it? Is this banishment? Did I screw something up?” George Abbey loves to run, always did run, just an inscrutable kind of management system. So if you worried about those things, you could speculate about them, but you were never going to get an answer. You could go ask George about them; you're probably still never going to get an answer. If you got an answer, especially with George, I would always kind of wonder whether I was getting a straight answer or a little bit of a gamesmanship answer. So it seemed to me, “There's no point asking those questions. Just put them aside and go.”

We spent eighteen months out there doing research campaigns in the two different airplanes. One was more Earth-looking mapping, and one was atmospheric sampling. Lots of flights. I got pressure suit qualified through that, because it flies above 50,000 feet, so we both got shipped out to Edwards [Air Force Base, California] to go through the Air Force chamber qualifications for pressure suit operators. I'm pretty sure I'm the first woman that the US Air Force ever certified for full pressure suit operation. At least those guys said that was so; certainly I was the first one they had done.

That was very fun, other than this little bit of vague concern that, “Hope this doesn't mean I'm falling off the face of the Earth.” The guys and the flights were fun. I went twice to Alaska. The agency had a multi-year contract with the State of Alaska to provide a consistent photogrammetric mapping base of the entire state, and so we went up and flew eight-week campaigns to get all of that imagery. Pinky and I both were on a mission down to South America doing atmospheric sampling at different profiles.

As I look back on it now, it's still, again, speculative, I suspect there was some positive intention on George's part. He had farmed Anna Fisher about this same time out to working on the tile repair task. There was an effort going on aimed at STS-2 to figure out what could you actually do in terms of sending somebody around the bottom of the Orbiter and fixing something. So it was in the little tiny water tank at Johnson because we didn't have the big one built. She was out there working with Dick Truly. I think he was one of the guys working on that with some other folks, and this assignment was concurrent.

I figured George reckoned he'd plop at least two out of these six gals into some kind of domain where he could see how they handled a pressure suit environment, those type of operations, and get a little bit of data points to inform who or when he might ever line someone up for a spacewalk. Given the way the stories turned out, that's my version of what that all probably meant.

ROSS-NAZZAL: Where were you when STS-1 finally launched?

SULLIVAN: I was at the Cape. I was assigned as a technical advisor and commentary support to ABC for that flight. ABC News, as it turns out, was trying to really boost their competitive advantage on the TV coverage. Gene [Eugene A.] Cernan was ABC's main on-camera commentator for the Space Shuttle Program. They were intrigued with the bookends: last man on the Moon, long hiatus, first flight of the Space Shuttle. You know, "A handsome Navy test pilot, this is very cool. He'll be our on-camera presence."

I show up, twenty-nine-year-old girl astronaut. I haven't ever flown in space, but I'm friendly. They said, "Lovely. Glad to have you. Go talk to the radio guys." So they banished

me to radio. “We paid for this guy.” The radio folks were lots of fun. I actually had a really good time with them. We did some workups in Houston before everything shifted down, and they flew me down to the Cape with the radio guys. Their plan was to just bring me back to Houston, while Gene would go out and cover the landing, and I was kind of disappointed at that. I thought it would be cool to see a landing, but, you know, I had figured out what the food chain was and where I had been placed on the ABC food chain, so that was kind of understandable.

We’re down at the Cape, and we’re in the countdown. They’ve suited up. We’re in the countdown. Gene is bantering with whoever the commentator was. We get down to the twenty-minute hold when you take the computers over to flight mode, and the radio guys are not trying to fill every single second contiguously, so I’m actually having time to listen to the technical loops. I know where we are; I know what’s supposed to happen. I’m following the countdown flow.

I hear “Crip” [Robert L. Crippen] say, “BFS [Backup Flight Software] didn’t follow the pass.” I know right away we’re not going anywhere. There’s no way. The very first launch, when the crew took the BFS to ops 1, if it didn’t synch up and track the primary flight set, I just absolutely knew there was no way. I couldn’t imagine that anyone was going to come up with enough of a diagnosis in ten minutes that we’re going to launch STS-1 when the BFS didn’t follow the pass. This was just not going to happen. We’re going to stop and really look deeply at this. I’m convinced.

We go into a hold. I’m listening to the chatter on the loops and it’s clear that the way people are thinking this through, the launch will be scrubbed. I can just tell from the way the Launch Director and the NASA Test Director are talking; their head is about where my head is. There’s no reason to hurry up and push through this. Twenty-four hours doesn’t hurt a thing.

Let's really know what we're doing here. Forty-eight hours doesn't even really hurt a thing; let's know what we're doing.

The hold just keeps extending and extending, and the agency's not saying anything yet about what's going on or what the intentions are, because it's more important to stay focused on the technical stuff. I tell the radio guys, "This ain't going today."

"No, they just said they're in a hold."

"Well, I know, but they've only said that because—," and I'm explaining to them. "But trust me, we're not going anywhere today."

Gene, meanwhile, is up there, and they're getting this from the editors. [Gestures] "Stretch it, stretch it. We need more fill. We don't know when it's launching. Come on." And they start asking Gene more and more detailed questions about what exactly is happening with the computers here, and he starts giving answers. They might have been Apollo system answers, but they weren't accurate Shuttle system answers. So I listened to a couple of these, and he kept getting further off the ranch.

At some point I tugged the radio producer's sleeve and said, "Does it matter that he's not giving correct answers?"

Whoom! The whole booth goes sort of nuts, and the next thing I know I'm on camera. It's radio, so I've got grubby jeans on. Nobody's seeing me. The next thing I know, they're going, "Get that girl up here," and I'm yanked up and plunked onto the TV desk.

Now the challenge is, how do you start giving answers without discrediting an accomplished astronaut. I didn't know Gene Cernan at all then. I still don't know him super well, but, you know, this is a really accomplished guy and he flew to the Moon and all that cool

stuff. I'll confess I probably had my feelings hurt a little bit that I didn't get any attention by the TV guys.

But, you know, I had no desire to come across as, "What an idiot! Let me tell you what really happened." So how do I finesse the transition? "What the captain meant to say was—," and then start giving the better answers. So I sort of helped them out of that.

Ran up to New York and gave a speech at the Explorers Club of New York the next day. I was one of first female members of the Explorers Club. Raced back and skidded out to the launch site again to cover for radio the next morning.

Well then they flew us back to Houston, and we're covering a little bit of the mission. The fun part of all of that was what I had done, and how I had done it. The radio guys and the TV guy I had bailed out went to bat with the executive producer and said, "Take her to the landing site. We want her at Edwards Air Force Base." I'm good on my feet. I follow things. I'm a good commentator. I'm a great explainer. They've now seen all of that, but I haven't been to the Moon; I'm not a Navy test pilot. "But, you know, she actually speaks well and makes it understandable in human terms. Get her to the landing site."

So I did end up out to the landing site for STS-1. That was a fun story, and Gene never said anything. I think I must have finessed that little transition reasonably well. As far as I could tell, he didn't have any cause to take offense.

ROSS-NAZZAL: For the next flight I saw that you were part of the chase team. How did you get that assignment, and what were in your duties?

SULLIVAN: You know, it's another one of those "beats me." You get that assignment because George calls you over and says, "Here. Here's what you're going to do." There was a massive undertaking for flying chase on STS-1. Jon [A.] McBride headed that up, and it became another one of the jokes of our class and of the office, that the "chase Air Force" was off, because you might land at the Cape. You might land at White Sands [Northrup Strip, New Mexico]. You might land at Edwards.

Edwards is intended, but you've got to be ready for all of them. The guys who were going to come up and join on the Orbiter have to be ready to do that. The Air Force radar controllers who are going to be tracking the Shuttle and help vector you in, they've got to have some training in that. Because STS-1 was so short, we had chase squads sort of planked at each of those three landing sites. You couldn't move. If you stationed them at Edwards and the vehicle came into the Kennedy [Space Center, Florida], you couldn't get them there.

It was an immense effort, and it just seemed like every time you turned around there were eighteen airplanes flying off in a giant gaggle somewhere to go practice. Of course, we quickly turned this into large amounts of teasing at Jon that he had just ramped this all up into the world's biggest boondoggle, which was well done and kind of cool. We were probably all a little bit jealous, but we were just tugging at him.

So STS-2 comes along. It's a little longer flight. It wasn't going to be quite that evolved. Hoot was the lead chase pilot, and I was tasked with being the primary photographer. We were doing a couple of pretty straightforward things there. We have a T-38.

The T-38 is a well-known aircraft. We're going to really rigorously calibrate the air data system that measures and calculates air speed and altitude. The Shuttle has only flown once at this point. It's got an air data system, but you stow that inside the mold line. You fly it into

outer space for a while. You run around the Earth for forty-eight hours. You come back through the atmosphere, and then you deploy these probes to make the measurements. They should stay in calibration and be accurate, but we've only done this once before, and it's really good to be sure that they're accurate.

So the primary job was come up alongside with a well-calibrated system, match altitude, match speed, and call out to the Shuttle commander, "Here's my air speed. Here's my altitude." He can check that with what he sees and quickly become confident that he's got the right measurements.

The other task was with the thermal protection system. You've launched the Orbiter. It's been in space for a while. If it has any little dings or cuts on the tile, we'd like to know what they are, how deep they are, where they are, before we land. Once you land on the runway, you'll have some debris and other things kick up and create some damage, and we want to be able to distinguish any damage that happened during liftoff or pre-entry, that went through entry heating, because we could use that to help verify how well designed the thermal protection is. Is it overdesigned? Is it underdesigned? We wanted to be able to discern those two classes of dings.

As we come up alongside and you swing over to the outside wing, my task was get a complete photo swathe of the bottom of the Orbiter so that you could have a map to compare to the post-landing map. So we went off, did lots of practicing at all three of the landing sites. We also were orbiting for liftoff, because if you did an RTLS [Return to Launch Site], the chase plane is going to join up on the return to the launch site and give you that chase call.

So at STS-2 liftoff, we were orbiting at about 38,000 feet just south of the launch site in a pattern that would have let us roll on back in if they came back home. As soon as they didn't

come home, we had pre-filed flight plans and then all the telephone calls to expedite all of our traffic control and fueling, and we just hoofed it. We landed, refueled, and hoofed it instantly out to California and stood by at Edwards until they came on in. So that was STS-2.

ROSS-NAZZAL: One of the other technical assignments I saw—and I'm not sure if this is indeed the case; we have some early files that say, "These are the assignments that we're giving the astronauts"—was your work on OSTA [Office of Space and Terrestrial Applications]-1 and OSS [Office of Space Sciences]-1. Did you actually work on those two?

SULLIVAN: Yes, I did. That was while I was at the Cape on the Cape Crusader thing. OSTA-3 was one of the payloads on my first flight. It was my primary payload. OSS-1 was the space sciences payload on STS-3, and I worked that at the Cape as a Cape Crusader on the science integration side of things.

Cape Crusaders follow the payload from the time it arrives at the Cape through all of its verification and testing; actually it begins upstream of that, making sure that the way we tested—in engineering set of things you want to be sure you verify a readiness to go fly, but what we would try to do as Cape Crusaders is infuse as much as possible of the flight procedures into those tests so that when you did the basic engineering verification, you were also helping verify the flight procedures.

So if the checklist said, "Flip this switch to that position and confirm that so-and-so's talkback goes to barber pole," you try to make certain that got in the right sequence just in the same point as it would have been in the flight checklist. Put this in here, and make sure that at that stage all the circuits are activated in the way the checklist assumes that they're activated, and

that's in fact what the crew will expect to see. We blended all of that stuff in every way possible into the ground checkout procedures. We ran the ground checkout procedures and then extracted the insight we had and could feed it back to the crew and to the flight data file.

ROSS-NAZZAL: What were some of the other technical tasks that you worked on until you were assigned to a flight?

SULLIVAN: There was another stint of working systems management software changes. You get flight gripes back and assess the technical analysis. Have we figured out how to fix it? Here's the patch, here's the change, and just follow those things through. Especially changes that really mattered to the crew interface, be sure they were heard well at the Change Control Board. Be sure they weren't getting squeezed out on cost or other things, or help inform the priority decisions if they were going to get lost, bring that word back to the astronaut corps. "There's only this much memory left; do we want this or this change, and what are the things we really ought to focus on here?" Be that intermediary.

Around the time of Sally's flight, I was evaluating a new spacesuit—it kind of flowed out of being the Cape Crusader but with a focus on EVA, spacesuits, and integration on the pad. So I actually stowed and did the preflight verification of the airlock on STS-7 and STS-6, which was the first flight to conduct an EVA for the Shuttle Program.

Shortly after STS-7, before the crew was put together for STS-41G, I was assigned the entire 41G cargo in what's called Mission Development. I was the early consultant to a cargo group that's putting together a flight, and I brought the crew perspective into all their planning efforts before they had an exact flight crew chosen. That's one thing I was doing is helping them

understand, “Here’s how flight crews work; here’s how we tend to go about things; here’s how the Orbiter tends to function or behave;” and inform how they’re getting ready to plan their stuff.

You may or may not end up flying that payload, so some crew is going to be assigned about twelve months before a launch. You’d like for them to be able to pick up a stack of checklists and systems documentation and know that there’s been an informed crew viewpoint shaping them up to that point, so they’re getting a fairly mature product to start doing the final detail and honing their own flight procedures.

The Mission Development Group tended to do that from the very early conceptual design phase and served as an advisor and consultant to those groups, into the early stages of cargo integration on both the engineering and the interface side, and just made sure that each flight crew, when they came along, got a fairly mature engineering and checklist package to take into the final twelve to twenty-four months.

So I managed the 41G cargo, which included the refueling experiment and the ERBS [Earth Radiation Budget] Satellite and the OSTA-3 payload, for six to nine months. I was charged with getting laid out right, laying out the experiment objectives, and writing the initial checklist. Then the crew was put together with me on it, and so then Crip sat down and said, “We’ve got three main experiments. We’ve got the satellite to deploy; that’s RMS [Remote Manipulator System] deploy; we’ve got a refueling experiment to do that’s got a spacewalk; and we’ve got this Earth sciences payload. I’ve got three mission specialists. How do I divvy this out?”

We had an arm operator in Sally, so that’s an obvious one. We need a geologist—me. The science community, especially this particular Earth science community, was really pushing hard that career flight status mission specialists “can’t know enough science to operate my

experiment. You need to take one of my guys as a payload specialist.” George, in particular, at that point was just really trying to bar the door against that. You can see a trend in several of the ’83, ’84, ’85 flights. “Match Jeff [Jeffrey A.] Hoffman up with an astronomy payload, match Kathy Sullivan off with a geology payload, and demonstrate the argument that we’ve hired the mission specialist corps to be able to bridge that for you, so your guy doesn’t get to go.”

So I got paired up onto that as prime. Dave [David C. Leestma] got the refueling experiment as prime. Then he and I were the two spacewalk folks.

ROSS-NAZZAL: Do you remember that day when you were named to that mission?

SULLIVAN: You know, it’s interesting. The short answer is no. The actual day that George finally told me is not the most memorable piece of that to me. The more memorable piece of the story to me is I had gone off backpacking with some friends up in the Wind River Mountains [Wyoming]; met some friends from Alaska and other places. We were, for two and a half weeks or so, way off in the high country, having a ball, just ignoring the universe.

We were in civilization at the farm; one of the gals had family, and they were putting us up on their farm as our base station going in and out. I get a phone call, and it’s Sally. This would have been July, I think. Sally’s calling to give me the heads-up that I’m going to get a flight assignment, and it’s going to be a spacewalk.

It was fascinating, because, at one level, of course, I was delighted to hear that, but at another level I had just so let go of all that and been so immersed that at the moment it was sort of a flat, “Well, okay, but, I’m actually really completely content with where I am and what I have right now. So who cares?” I wasn’t there all wrapped up in the normal hype and fervor

associated with, “We hear there’s flight assignments coming. We hear there’s flight assignments coming; I hope I am named to a crew.” That had all fallen away for about three weeks, and so, “Oh yes. Okay, fine.”

Got back to Houston. It ended up being I think six weeks, or some uncomfortably long time, between when I knew but no one else knew, or no one is supposed to know. It’s really bad form to have anybody other than the agency announce your flight assignment, and I had five public appearances in between then. Of course, they’re just poking. “Sally has flown, and who’s next? Is anybody next? Were you disappointed to not get to go?” All that is still swirling around. “Were you disappointed not to get to go first? Do you know yet when you’re going to get to go? Are you ever going to get to go?” All of that is swirling around. That was not really fun.

I blew the cover. At least there’s some appearance, rather, that somebody managed to bait me enough that I blurted out a little bit and then quickly realized I probably went a step too far, and I hope this doesn’t go too very far. Gerry [Gerald D.] Griffin, who was the Center Director at the time, lived just a couple of blocks north of me, and I remember going off on one of my runs, still fretting over this. I went and knocked on his door and said, “Hey, boss, I may have just screwed this up.” I just told him what had happened, and he was so funny.

He just laughed and said, “Yes, you’re the only one who’s ever done this, and it’s really going to matter. Thanks. Appreciate it. Get over it. Forget it. Go home.”

So I remember getting that phone call, more than I remember whatever eventual go over to George’s office and get told you’ve got a spacewalk.

ROSS-NAZZAL: You mentioned something that I wanted to ask. Was there any sort of competition between the women in terms of who was going to fly first?

SULLIVAN: Well, you know, it's not really something that there could be an overt competition on. In a certain sense, everything you're doing and how you're doing it is somehow, probably, going into this decision process, whatever the heck the decision process was. That's also deliberately inscrutable. Again, you could watch all the doings, create your mental model, speculate about it, score keep the whole thing, and you might be right, or you might be totally out to lunch. All that struck me as a sort of a pointless way to spend a lot of your time and energy.

We would all get caught up in it now and then and worry and obsess about it, because it was just deliberately a quiet black box. I think this is very conscious, I think, and maybe it's another part of the test, I don't know. Now and then the hand would come out of the box with flight assignments, and then it would go back down. What the hell was in that box and how it was being done, I, to this day, have not a clue. So, yes, I would have loved to have gone first. I was confident in my abilities.

The short list of rules of flight assignments are, "All flights are good flights. Sooner is better than later. Longer is better than shorter. High inclination is better than low inclination. When in doubt, refer to rule one;" the five rules of flight assignments. So we all lived by those.

There clearly was some kind of a horse race or beauty contest. The agency was eventually going to have to pick one of us. I certainly never believed there would be two of us on a first flight. You might get away with putting one on, but don't ever put two on the first mission.

It's idiotic, but I've seen this too often. It's how the world works. Let's test with one, because if it's two, Lord only knows what would happen. It's going to be one, and they're going to get around to it eventually. They're going to have to get around to it. We're all in line behind the guys that were here before we got selected, so none of us are going before all of them are lined up. It's going to have to be sooner than later within the Shuttle sequence, because they'll just get torn apart if it's not. If they've flown our whole class and the six of us are at the end, they're dead, so that's not going to happen.

Somebody is sitting around watching what we do, how we do it, how we dress, or how we'll look on covers of magazines. Beats me. Somebody is looking at all of that, deciding who goes first. My bet, just my own mental model, was it's NASA, and there will be a major league effort try to draw the public interest out. I've got to bet there's some big factor that, all other things being equal, they will pick a cute one who gets on lots of covers. This is all guys making this choice. Somehow that's in there. So that probably means Anna, Judy, Rhea, and Sally have a qualitatively better chance of getting the nod first than me or Shannon, probably.

So it's happening, but what are you going to do? How are you going to compete? What do you do to compete on that? You, I suppose, could try lobbying, but in this environment and with these things that we're taking responsibility for going and doing, if you think spinning and lobbying is going to win the day, (a), I hope you're wrong, and (b) you should be wrong, and (c) probably everyone else around there thinks you should be wrong, too, and what you've just shown is you're not really the kind of person I probably want to be counting on, because you think you can talk your way out of things. I don't need talk; I need someone who can fly the Shuttle. I need someone who can fly the arm or handle the spacesuit and who just quietly kind of goes and does that, not who stands up and does all of this pretending they can do these things.

I would have loved to go first. The decision was not unexpected. As I went through my calculus formula, on just my own assessment of bearing, style, acumen, and assignments that had been had, I said, “Sally’s probably in the lead.” I didn’t think any of us would do a bad job, but if my scoring sheet was kind of about right, I had reckoned Sally was probably in the lead. Partly made perfect sense, you know; partly wounded my pride because I’d like to get that nod.

Until the STS-7 launch, I was in the conference room with everybody watching every launch. I was interested in getting my scuba qualification finished in 1983, because we got all the scuba quals [qualifications] done but we didn’t get an open-water check yet. If you wanted to actually get a scuba card, you had to make your own arrangements to go do an open-water dive with a different instructor and have them sign you off.

So I decided I really wanted to do that, had that all set up, and received an invitation to give the commencement address at UC San Diego on the day before or after the STS-7 launch. I decided spur of the moment when that came in. I thought, “You know, what the hell? I’m going to accept this. I’m going to line up with this guy at Scripps [Research Institute, La Jolla, California]. I don’t get to go on this flight, but I don’t need to be sitting in the conference room watching the launch. I want to go do something else.”

I watched the launch. My brother came down to go out on the ship and do the dive quals with me. We woke up early and watched the launch. He turned it off. He said, “Okay, so you should have been there.”

I said, “Yes, I could be there. It would be fine.”

He said, “Okay. Let’s go dive.” So we went off, and I got my open-water dive checked that day.

The end of STS-7 also had an interesting story, though, because they were meant to land at the Cape, and there was this immense crowd of VIPs [Very Important Persons] who were going to be the very first special people to get to meet the now-famous first American woman to fly in space. But the STS-7 crew landed at Edwards.

As soon as it became clear that they were going to send the vehicle to Edwards, NASA recognized that there was a big problem. There's 2,000 however many VIPs in Florida expecting to meet someone really neat and interesting, and she won't be there. Someone went patrolling the hallways in Building 4 and grabbed me. "We need a pilot, and we need another one of the women, and we need to go placate these people."

They grabbed P. J. [Paul J.] Weitz and they grabbed me. They said, "Go to the Cape. You're the replacement. You're the designated hitters. Faint substitutes, to be sure, but too bad. You're it."

We flew down to the Cape and walk into this immense sea of people. It was a really interesting moment. Two thoughts instantly went through my head. One was, "I am really happy that Sally's in California and gets the six or eight hours to just digest what she's just done, absorb it, let it be hers, because it ain't much going to be hers. It's quickly going to become everybody else's." I was just instantly really happy for her that she had this little hiatus to make her own initial sense of the flight—to enjoy it and bask in the moment.

The next thought was, "And if this is what you get for going first, she can have it." I told her that.

ROSS-NAZZAL: You do have your place in the history books. You were the first American woman to do a spacewalk and the first mission with two women. What was the media coverage like for STS-41G?

SULLIVAN: There was some. There was certainly some. Some of it was “Crippen and Ride fly again;” oh, by the way, some other people, too. So that was interesting. One of the things each of the women who flew after Sally had to deal with, that she didn’t, and I think I had to deal with a little more because her second flight was my first flight, was no reporters asked me, “How are you feeling about this?” They’d ask Crippen, “Do you think Kathy can do this?” Or they’d ask Sally, “Do you think Kathy can do this?” And I’d say, “Hello, I’m right here! Hello. Hello.”

As Crip divvied out the payloads—putting Sally with her arm experience on the ERBS satellite, me to placate the geologists on the radar thing, Dave on the refueling experiments, that made me EV-2. I’m a class senior to Dave. I’ve been in the program longer than Dave. I’ve worked in the suits more than Dave. I worked this payload longer than Dave did, and I’m number two to him on the spacewalk. That’s really bad optics.

I take Crip at his word it was that kind of basic logic. I don’t have any reason to think it was either Crip or George saying, “I don’t know if we can let her lead the spacewalk.” You’ve got two rookies doing the spacewalk. It is the norm in the office, and in the culture, that class rank matters, and the senior class guy leads; that’s rarely, rarely breached, and I wasn’t real comfortable that it was breached in this case. It wasn’t real fun trying to explain to the media.

Of course, the media looks at that, and the media has the same assessment I had, so there was an awful lot of probing at Crip and probing at me. “Are you EV-2 because no one’s really sure you can do this?” That was less than real fun. I just went up to Crip and said, “You guys

answer this. Don't be asking me to answer this, because I don't see any particularly good reason I'm not EV-1, but it's your call. So you answer." They answered that at the press conference.

There was a sense—I think Jon McBride felt this some, and I felt this some—that the story was Crippen and Ride “the second flight,” and everything else had a different rank to it. Probably not at the time of the launch, by then it was all over. In the early press stuff it was very much slanted that way. Sally was still right in the bull's-eye of all the media interest. The flight was announced all of about five or six months after her first landing, so there's still a flood of interest surrounding her.

I poked at her pretty hard about this for a little while, and actually, I had the flight shop guys make me up a new name tag for my flight suit, because to some degree, when all of our PR stuff would happen, people would come at me, and they didn't actually really want to talk to me. They wanted to know where Sally was. The thing that seemed to matter was I wasn't Sally; “You want the other one.”

I actually had a name tag made up that used the Boolean algebra symbols. If you have an “and gates,” and it's the inverse of that, you just put a bar over it, and it means “not and.” So I had a name tag made up that said “Sally” and had a bar across it. For a little while, in the simulators and other places, I just wore a name tag that said, “Evidently what I am is ‘not Sally’ . Can't help that.” She was less than thrilled with that line of teasing.

ROSS-NAZZAL: Well, I think this might be a good place for us to stop. We sure appreciate your time today.

[End of interview]