

NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT ORAL HISTORY TRANSCRIPT

JOE H. ENGLE
INTERVIEWED BY REBECCA WRIGHT
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WRIGHT: Today is April 22nd, 2004. This oral history interview with General Joe Henry Engle is being conducted for the NASA Johnson Space Center Oral History Project in Houston, Texas. The interviewer is Rebecca Wright, assisted by Sandra Johnson and Jennifer Ross-Nazzal.

Thank you again for taking time for the project. I'd like to start today by asking you when your interest in aviation began.

ENGLE: I don't know, honestly, when I did not want to fly airplanes very badly, when my aviation interest started. My mom used to say the same thing to me, that she couldn't remember me seriously wanting to do anything but fly airplanes. Of course, I went through the fireman and the cowboy games and things with other kids, but my core desires and my core toys were always airplanes and flying. I just don't ever remember wanting to do anything else but to fly an airplane, which is probably a good thing, because I have limited skills, both academic and hand-eye skills, so it was good to be able to concentrate on one thing, I think.

WRIGHT: What impact did the Junior Flying Tiger Squadron of America have on you growing up? Talk to us about your first group of comrades that studied airplanes in the basement of a house.

ENGLE: The motivation was there even before the Junior Flying Tiger Squadron of Chapman, Kansas, was formed. The first recollection that I have of a toy was a little tin airplane that my older sister cut out of a tin can, out of a fruit can or something, with a pair of tin snips. It had very, very sharp edges on it, and I do remember being so young that I wanted it, but my mom wouldn't let me play with it because it had sharp edges and she said that it could be dangerous. So it may have been a little bit of wanting something that you can't have that got me going, but I don't think that was it really.

I remember reading about airplanes in magazines. Didn't go to movies very much in Chapman. They had a movie theater, but we didn't go there very often. But I do remember two movies, one was of bush pilots in Alaska and the other was on the Flying Tigers, and those two were things that I would imagine being and doing as I would play in the backyard. We had a big, big area on the edge of town, and I would dig a pit in the sand and that was my cockpit, and I would get a stick or a tree branch or something for the control stick, and take old tin cans and push them in the front for instruments, and just really be a hero, shoot down Japanese Zeroes [Mitsubishi A6M] right and left, with that. I can remember that very, very distinctly.

I remember playing with other kids in the sand. Tommy Durham had a great road grader, I remember, that I didn't covet it, because I remember my parents brought me up very much in the church and you're not supposed to covet other people's things. So I didn't covet it, but I sure wished I had one like it. While the other kids were making roads and things for cars, I would borrow it and make a runway off to the side in the sand. So the desire was there.

The Flying Tiger Club was a group of seven, I think, of us that all had an interest in airplanes. Our squadron commander was Mary Kay Meyer, who was a great softball catcher in the girls' softball team. We would have dues; we'd have nickel dues. We'd pay a nickel every

week and we met every week. We'd take that money and we'd buy airplane magazines, and then they'd go into our library in the basement of Jack Letterman's house, where we met. We made another cockpit down there in Jack's basement, and studied about the Flying Tigers, studied about all airplanes, in fact.

WRIGHT: What a great memory. Did any of your friends go off to school with you at the University of Kansas [Lawrence, Kansas]?

ENGLE: Actually, Jack Letterman went to the University of Kansas. Jack's dad was the local grocer in Chapman, and Jack took a business degree and later became a manager for a food chain. George and Mary Kay and Barbara Meyer all went to K-State [Kansas State University, Manhattan, Kansas], and Tommy Larsen—actually, he went back East to college, come to think of it. But most of the town was pretty much K-State oriented. It was a farming community and K-State was an agricultural college. My dad and both my sisters went to K-State, and I probably would have and should have. I thought I was going to, because it was injected into my blood at birth, but they didn't have an aeronautical engineering degree, and by the time I got ready to go to college, I knew I wanted to fly airplanes, and if I did, I knew I wanted to study something that had airplane in the degree, so I went on down to KU [University of Kansas].

WRIGHT: You finished in 1955 and received a commission through the ROTC [Reserve Officer Training Corps] and entered flying school in 1957. Could you tell us about that process and how those days started, as you earned your wings?

ENGLE: You bet. Chapman didn't have a runway, an airport, so my only exposure to flying, really, was at the annual Labor Day celebration they have in Chapman, which all the farmers would bring in their goods and display them, but there was a guy who landed on an alfalfa field and was giving rides one Labor Day weekend. We had a carnival come to town, and I took my allowance for the carnival for that weekend and put it together with another guy and we bought a very short ride in an old Stearman [Biplane] and went around town once in it and back and landed, and that was my first exposure to flying.

I didn't really get to fly until while I was in college during the summers. I started working at Cessna Aircraft Company in Wichita [Kansas] as a draftsman. I had a very good supervisor named Henry Dittmer, who had an instructor's license and had an airplane of his own, in fact. Henry was just a real influential mentor to me. He made sure that I appreciated flying and all the aspects of it, all the safety aspects as well as the meaning of what it meant and the responsibilities of flying. He did teach me to fly. He gave me flying instruction at no cost, and I think, in retrospect, in order for me to appreciate it more, he made me procure or get the airplane to fly in. So he got me a job at the airport where he kept his airplane, and I would, in the evenings after work at Cessna, go sweep the hangar and sort bolts and nuts, and I would get one hour of flying time in their airplane for eight hours of work and then Henry would instruct me. So I really got started flying between my sophomore and junior year in college, when I started working there.

I built up time as fast as I could. The Cessna Aircraft Company had an employees' flying club that the rates were just extremely reasonable, extremely low, and you could get a couple or three people from work that would want to go up and fly around in the evenings and pay for the airplane if you would fly it, and that was the way for me to build up flying time.

Then, later, junior and senior years in college, my friends, who were in naval ROTC and had summer cruises, would go to Langley, Virginia, from Kansas and they had a train allowance for a ticket, and it was just as cheap for me to fly them in the Cessna employee's flying club airplane. So I built up a lot of time during the summers hauling my friends back and forth to the East Coast, and thoroughly enjoyed that.

WRIGHT: I'm sure those were fun trips for everybody.

ENGLE: They were. Very exciting, very fun.

WRIGHT: In October of 1957, Russia launched Sputnik [satellite], and a year later, the [President Dwight D.] Eisenhower administration established NASA. At that time, how closely were you watching the space race and the fledgling space program for the nation?

ENGLE: Not very close at all, really. I think I was aware of it, but didn't pay particular attention to that, because at that time I was just finishing up fighter gunnery school and on my way to [Boeing] F-100 [Super Sabre] transition to being a fighter pilot, which is what I really had just dreamed about doing all my life. I know that I was totally focused on my flying school and my performance in flying school and focused on being the best fighter pilot that I could. At that time I know I had been able to select the base assignment that I wanted and the aircraft assignment, and I knew I was headed to F-100s at George Air Force Base [Victorville, California]. I really was pretty much focused on that and, like I say, was aware that NASA had been established, but really didn't have that in my plans. I just didn't.

I might say, in retrogression, back to the flying in the summers between school years, college years, at Cessna, the last year that I had worked there—in fact, I graduated and had to wait about nine months to get assigned to a flying school, because there was a backlog of people wanting in flying schools—Henry Dittmer had bought a kit airplane, a Stits Flutterbug, an ugly little airplane, but it was one that you could build yourself pretty easily, prefabricated wings. He was a widower and lived in a house right off the end of the runway at Cessna, so we turned the house into an aircraft manufacturing facility. We built the wings up in the garage, and the fuselage was in the living room. The tail feathers—the horizontal stabilizer and rudders were upstairs in one of the bedrooms that we didn't use, and the kitchen was turned into—we rebuilt the engine, tore the engine down and rebuilt it. So the house was turned into an entire airplane—everything smelled like airplane dope and grease and stuff. But it was just an experience that I will never forget.

WRIGHT: Great place to be.

ENGLE: Great place to be, and it was out in kind of a desolate area, and I remember when it came time to demonstrate that the airplane was airworthy to the FAA [Federal Aviation Administration], we had to take it out to a little airport runway that was four or five miles away. We would take it out in the front yard and run the engine up just to get time on the engine. Tie a rope around the tail and to a tree and start the engine and let it run just to get some time in. The morning that we were going to go out, we got up a little early and I thought we were going to tow it out to the airport, and Henry said, “Well, let's put the wings on one more time and see if they fit.” So we did, and he checked the controls out and he said, “Tell you what. I'll meet you

out at the airport,” and he proceeded to taxi out on the street and took off on the street to fly out to the airport so that the FAA guy could then show up mid-morning and look it over thoroughly and see if it was safe to try and fly. [Laughs]

WRIGHT: Did you have an opportunity to fly it as well?

ENGLE: Oh, quite a bit, yes. Yes, I flew that an awful lot. It was a fun little airplane to fly. Very basic.

WRIGHT: You certainly knew every nut and bolt that went into it.

ENGLE: [Laughs] Yes. Yes. It took a little bit of time to get it rigged just right so you didn't have to hold pressure on the control stick to fly so you could take your hands off, but it was a fun airplane to fly.

WRIGHT: How exciting was it for you to learn that you were assigned to George Air Force Base and be on your way?

ENGLE: Very exciting, because George was only forty miles from Edwards Air Force Base [California], and by that time I had my degree, and, while getting my degree, I saw an opportunity to apply some of the engineering that I had learned and decided that being a test pilot was probably a good way to fashion a more secure or more long-range career in flying.

Plus I think there was a little bit of tugging. My parents were very, very supportive of my wanting to fly. My dad was a vocational agriculture instructor at the high school, and Mom was a teacher. They knew nothing about airplanes. Nobody in Chapman knew anything about airplanes, except the one guy who was a total airport bum, drunken bum, and he would fly over at Abilene [Kansas], and that was the only exposure they had. So it was really kind of tough, I know, for Dad to explain to all the faculty and his friends that his son wanted to be a pilot. [Laughs] I know he would have liked for me very much to have gotten into farming or agriculture of some kind, but he was totally supportive. Both Mom and Dad were very, very, very supportive, and I just totally, totally appreciated that.

WRIGHT: George Air Force Base was a little bit far from them, too, so that was a big separation for you as well?

ENGLE: It was, but I knew that when I had made the decision to try to go into the Air Force, that it would mean being away from home and being a long ways away from home, and I also knew that the Air Force was really the only way that I would be able to afford to fly, because flying, even then, was relatively expensive. And flying the kinds of airplanes I wanted to fly was not possible in anything but the Air Force. Plus, I wanted to be a fighter pilot.

Actually, I really wanted to be a Flying Tiger pilot in World War II. I think I was nine years old when the Japanese surrendered. I do remember that I got to ring the bell at the Methodist church on V-J Day [Victory over Japan, August 14, 1945], and I do remember very, very vividly that I really had mixed emotions about that. I mean, I was very glad the war was over, because I could see everybody was happy and relieved, and being nine years old, you

know, you don't appreciate those things fully. But tearing at me from the other side was the realization that I would never get to be a Flying Tiger fighter pilot and shoot down [Japanese] Zeroes. [Laughs]

WRIGHT: That's kind of a long distance in between that time period, from nine years old till you actually got to start flying.

ENGLE: Oh yes. It sure was. You bet.

WRIGHT: Tell us about those first days at the Air Force base and how you were able to start living out your dream.

ENGLE: I don't recall any real problems, because every opportunity was just that; it was an opportunity and an adventure, and a fulfilling adventure, because it was doing things that I had literally daydreamed and dreamed at night about all my life. Plus, [Charles E.] Chuck Yeager, who I had read about, but didn't know at all, was the squadron commander of the 1st Fighter-Day Squadron, and I, of course, would like to have been assigned to his squadron, but unfortunately wasn't. Unfortunately wasn't, and yet fortunately, I was assigned to a new squadron that was being formed that was located right next to his squadron on the flight line, to his operations building. It was kind of like an expansion team on an NFL [National Football League]. They took a few guys from the other squadrons to form the nucleus of this new squadron, and then all the new guys, of course, coming on board, were assigned to the new squadron, so I was assigned to the 474th.

But I do remember knowing what Chuck had done, because he had obviously, of course, broken the sound barrier and was a famous pilot by then, and someone who I certainly admired and held as a role model. I would watch him from our ops [operations] building, and I'd go over to our maintenance shop and watch him walk out to the flight line with his parachute on, and I tried to learn to walk like he did, you know, and talk. Of course, he's from West Virginia and nobody can talk like a West Virginian, unless you're from West Virginia. But I would do that. In fact, I would even go over to their briefing rooms when I knew he was briefing for a flight and just listen, just to hear him talk and listen to him brief to his pilots. Just really, really admired him, and got to fly with him occasionally, because we would intersperse with squadrons in flying.

I recall very vividly one time, I had advanced, I had progressed to the point where as a young second lieutenant I was designated a flight leader. I could lead a flight of four F-100s. At that time, our primary mission was air defense or air combat maneuvering, so we would learn dog fighting. That was our primary role, air to air. Our area that we practiced most of the time was over Death Valley [California], an area that was called Stovepipe [Wells] on the maps, because it was so hot on the ground in the summertime.

I had a flight of four up and that was where you always found somebody to engage in a mock dogfight. I noticed two airplanes coming back from the northeast, heading back toward George, so I called the flight and we set up for an attack, and I just was salivating because everything was ideal and rolling in. We rolled in, and it turned out that those two airplanes were Chuck Yeager and Don Wasky [phonetic], who was our operations officer, who had been up to Nellis [Air Force Base] to check out for some advanced gunnery school classes that we were going to go to, and they were coming back. They were undoubtedly the two best fighter pilots at

George and I found that out real quick. They completely tore up my flight and just scattered us to the winds, and I learned then to be a little more cautious when making attacks and not get too overconfident. [Laughs] Chuck loves to tell that story, too.

WRIGHT: He likes to remind people.

ENGLE: He loves to remind people.

WRIGHT: It's always nice to get that other side of that story.

ENGLE: Right. [Laughs]

WRIGHT: But when you applied to do Air Force Test Pilot School, he recommended you.

ENGLE: He sure did. Probably one of the reasons was that I learned that I needed 1500 hours of flying time to be able to apply to the test pilot school. They didn't say what kind of flying time, although they preferred it to be high performance. But at that time you really could fly most anything you were willing to devote the time to go fly, and we had a squadron based at George that did aerial tow-target work for not only air-to-air gunnery for our fighters, but also for the Army. They'd tow banners on long ropes for the people on the ground to shoot at. They flew old [Lockheed] P-80s [Shooting Star] and [Martin] B-26s [Marauder], nothing spectacular at all, but they were airplanes and they were flying time. So on days that I was not scheduled to fly in the squadron, and on weekends, I would go down and fly with them. Also, in the mornings, we

had an old De Havilland Beaver, an old bush plane really that we would ferry people back and forth to our gunnery range, the range officers that score the targets and things, and I would fly it back and forth, again just to build up flying time.

I learned later that Chuck's philosophy was that the good pilots are the ones who have the most flying, who go after flying the hardest and take it serious, and I think that that probably influenced him to support and recommend me for the test pilot school more than anything else.

WRIGHT: Could you share with us what that was like being in test pilot school? How did they start training you to move into your new position?

ENGLE: The Air Force Test Pilot School, I guess I've had the luxury of thinking about it since I got out of there, but it really was, to me, like a master's degree in flight testing. Most of the people, actually, who were accepted to test pilot school, already had master's degrees. I did not. I only had a bachelor's degree in aeronautical engineering. So to me, it was like getting a master's degree, and it was very intense, academically and flying-wise as well.

The normal day would be, in the mornings we would fly, because the air was more stable, more smooth and cool at Edwards, and then on the desert there in the afternoons, the turbulence, the heat rising off the desert would cause turbulence and make it difficult to get good, stable data points. So the mornings were devoted to flying and the afternoon was devoted to academics, and the evenings and nights were devoted to studying and getting ready for the next day.

It was a very, very intense one-year course. It was strictly aerodynamics, flying an airplane in the atmosphere, and flying airplanes, and preparing people to go out into the Air

Force, the various flight-test centers in the Air Force and do the test and development work on new airplanes.

I enjoyed it, but it was very, very taxing for me academically because I wasn't really strong academically, even in college. In college I was not, I think partly because I had my mind on other things, but, again, as I said earlier, fortunately, it's the only thing I wanted to do, so I was totally focused on that and that's probably the only reason that I made it through.

WRIGHT: You were part of that environment, but then, in [19]63, there was a new Aerospace Research Pilot School that Yeager, I believe, had become Commandant of. Tell us how you were able to move into that, and then, of course, the differences and the similarities between the two.

ENGLE: Yes, from test pilot school to the aerospace research. I got assigned to fighter test operations at Edwards, which really was, well, for most people, their first choice, their prime choice, because Edwards really is the focused flight test center of the Air Force. The other test centers do development work, separation store, separation work, or other kinds of things like that, various weather-condition testing, but Edwards is where the experimental flight testing takes place, and so everybody really wants to go there. I felt really, really lucky to be there and to be in fighter test, and was just having a ball, flying all different kinds of airplanes. Edwards has the most variety of airplanes on the ramp of anywhere, and at that time you could fly anything that you were willing to take the time to go check out in and fly, including—I'm not really sure what the restrictions or regulations were, but there didn't seem to be anything other than use common sense and don't bend anything.

One weekend, I know, a couple of Navy pilots came in from Patuxent River with two [Douglas] A-4s [Skyhawk]. They were going to do some flameout tests, restart test, actually, on the new engine that they were putting in it. One of the airplanes had the new engine and they would shut the engine down and then set up different speed and altitude conditions and see if they could get a relight. If they couldn't, then they could land on the dry lakebed at Edwards, which is, as you know, an ideal place to land a flamed-out airplane. They were flying on the weekend because they could have the lakebed then; we didn't fly on the weekends, so they were out there.

At the bar on Friday—the Navy guys coveted our G-suits [pressurized anti-gravity suits]. They had a different design of anti-G suit and they liked ours for some reason, and I got joking with the guy who was running the test and said, “Boy, I'll trade you one of these G-suits for a flight in that A-4.”

He laughed and said, “Yeah, well, that might work some day.” The next morning his chase pilot didn't show up. He ended up going down to Los Angeles [California] and partying with a bunch of folks and didn't show up Saturday morning. So he called the house very early in the morning and said, “You still got that G-suit around?”

I said, “Well, I can get one.”

He said, “Well, my chase pilot didn't show up and I really need to get these flights off. If you want to come down and be my chase pilot this weekend, why, you can fly the other A-4, with the little engine in it.” So I did. I got to fly all weekend in a new Navy airplane, which I enjoyed very, very much.

But the experience that I got down at fighter test flying, in all various kinds of airplanes, was just heaven, just a pilot's heaven. So when the subject came up of—the Aerospace Research

Pilot School was new. It had just started up and the first class had gone through and they said, “Okay, we’re ready for some more people now.” Mike [Michael] Collins and I were in fighter test together and we talked about it, and Mike wanted to come down to NASA and fly the Gemini and fly Apollo. So we decided, “Yeah, it’s probably the way the Air Force is going to go. We probably ought to do it.” Then, before we knew it, the names had been selected for the next class and Mike and I were there, so we didn’t have a choice, really. So we went to the Advanced Aerospace Research Pilot School together.

To be honest, I really had mixed emotions, because to me it meant the possibility of leaving stick-and-rudder flying, which I had coveted my whole life, and the potential of being a capsule pilot. During the time that we were at the school, NASA announced a new class selection for astronauts, and Mike and I both applied.

[Major] General [Irving L. “Twig”] Branch one day called me up to his office and said, “I’m pulling your application to NASA.” I thought maybe I just wasn’t qualified or I’d done something wrong or something. He asked me, “Did you really want to go?”

I said, “Well, I thought that would be a career thing.”

He said, “Well, we have something else in mind for you, but I can’t tell you right now.” So I accepted that as a military officer and went back to school and finished school. Right about the end of school, they announced that [Robert M.] Bob White would be reassigned from the X-15 program and I was going to be his replacement, and that just thrilled me to death, because it was a chance to get into place, to fly into space and to do it with a winged airplane, with a stick and rudder. Besides, I was young enough I felt that I could still have another application to come to NASA if I wanted to, and that turned out to be the case, fortunately.

That's how I found out that I would be an X-15 pilot. I didn't apply. You didn't really apply. Everybody wanted to fly the [North American] X-15. You just kind of sat back and hoped that somehow the gods would sprinkle that dookie dust on you that had "X-15" on it. [Laughs] I was just thrilled to death.

So then I actually went back to fighter ops [operations], where the Air Force X-15 pilots were assigned, flew other test programs, but then flew the X-15 down at NASA as well.

WRIGHT: Let's talk about some of those other test programs and some of the other planes that you flew before you moved primarily into the X-15. Could you give us an idea of some of the planes, especially the ones that you really found either more challenging or more exciting to fly?

ENGLE: My first assignment after getting out of the test pilot school was a fun airplane to fly, and that was the [Cessna] A-37 [Dragonfly], and at that time it was designated the YAT-37. It was designed and purchased as a very low-cost close-air-support attack airplane really initially designed for Third World countries, for Central and South American countries and whatnot. It was in a design competition with the [North American] YAT-28 [Nomad]. These were both trainer airplanes, the T-37 and the T-28, modified and adapted with larger engines and with pylons, stores-carrying capability on the wings, and guns.

I was assigned as one of the two project pilots of this competition fly-off. [Russell L.] Russ Rogers was the senior test pilot at Edwards and he was taking me, as the new guy, to help do this evaluation. He asked me if I wanted to be assigned to either one particularly, and I had actually done some flight test engineering in flying in the T-37 at Cessna, when I was working there, working my way through college, as it was being developed as the trainer for the Air

Force, so I picked the T-37. We flew both airplanes, but that was my primary responsibility, and it was just really fun to take that little airplane, that little airplane that I had helped work on at Cessna, to develop it into the primary trainer for the Air Force, and then now take it in its expanded role to close air support.

That airplane and then the [Northrop] F-5, called a Skoshi Tiger ["little" Tiger], again, a small lightweight fighter that was being built as a low-cost fighter, was another project. Then actually all of the Century Series fighters were going through improvements in stores and weapons improvements that were being tested initially at Edwards, so it was a matter of getting to fly all of the Centuries, all the F-100, [Convair] F-102 [Delta Dagger], [Lockheed] F-104 [Starfighter], [Republic F-] 105 [Thunderchief], [Convair F-] 106 [Delta Dart], all of the Century Series fighters were in the stable and you could go fly them whenever you really felt you wanted to or needed to. Just an ideal place for a fighter pilot.

WRIGHT: Tell us how that worked. How did you prepare to check out on these planes initially, and then how did you basically sign up to fly?

ENGLE: Well, maintenance and the confidence of maintenance and the condition of the airplane as far as being flyable, that was never questioned. Maintenance at Edwards was absolutely superb. I think they probably handpicked all of the maintenance people as well as pilots, because they did have very high-performance airplanes and a variety of them. People learned, I think, to be possibly a little more flexible in their learning processes and attitudes toward airplanes, and more generic. And at that time airplanes were not as sophisticated as they are now. Not to say

that every airplane flew exactly alike, because it didn't. But they all pretty much took off, landed, at different speeds, but the same techniques were used for most all of the airplanes.

So, checking out or transitioning from one airplane to another, sometimes if there was a two-place airplane, an instructor, a person who had a lot of time, a check pilot, would be in the backseat as a safety pilot for the first flight or two. If not, there'd be a chase pilot fly with you and talk you around the patterns and talk you through different maneuvers that you needed to be kind of familiar with on that particular airplane. But not always. It was very different. It was much less restrained at that time and, as I say, you could fly really anything that you really felt confident in flying, and it was left up to the individual more.

I've heard Chuck say in talks that at one time he was current in twenty-eight different airplanes in one month. He flew twenty-eight different airplanes in one month at Edwards. So the opportunity was there to fly different airplanes. In fact, the flight test philosophy at that time was to encourage you to fly as many different airplanes as you could, because that gave you more of a calibration to—when a new airplane came along, it allowed you to identify its unique features better and be able to handle them better, too.

WRIGHT: What were you looking for when you took these planes out and how did you report your findings when you landed?

ENGLE: At Edwards, after the initial performance, which means what is the best speed to fly at from a fuel efficiency; what's the maximum speed you can fly before you start to run into controllability problems; and then the handling qualities, the stability and control and handling qualities. What speeds and acceleration G-maneuvers or angles of attack or configurations, gear

down, flaps down, various stores, symmetrical stores or asymmetrical stores; what flight envelopes do you need to be aware of and which ones do you need to not go beyond with different configurations like that, were things that were identified primarily at Edwards. Then those conditions were put then in the pilots' handbooks that would then go to the pilots in the fighter squadrons around the country, around the world, really, so that you avoided losing a lot of airplanes inadvertently like that. Because the airplanes, a lot of them flew very good. They were fun, wonderful machines to fly, but they were thoroughbreds and they all had a personality of their own and they all had conditions that were not really friendly to flight.

WRIGHT: Did you have ground duties as well?

ENGLE: The only ground duties that I can remember at Edwards were an occasional runway control, where you sit out in a little shack on the end of the runway to talk a guy down or observe. Not like in a squadron; we didn't have ground duties like that.

We did have one that would be classified, I guess, as a ground duty, and that was the barrier testing. They used to have kind of a net up at the end, you know, that if you didn't have brakes and you were running off the runway, your nose gear would catch this and a cable would come up and catch the main gear then and stop you with a big log chain. Since then, they've gone to hydraulic drums that play out a cable, and now they have hooks instead of the web.

But we used to also test different airplanes in running into a barrier. The old runway at Edwards had a barrier set up and the runway spit right off into the lakebed. Both of them do now; the new one does, too. So if you were taking off and had a power failure, you could just settle right back in and land and roll out on the dry lakebed.

We would get these fighters going at different weights and different conditions and deliberately engage the barrier to see if there was a speed envelope that was good or what the envelope was and how the airplane reacted. [James A.] Jim McDivitt, in fact, took an F-104 into the barrier one time. It only hooked one of the main gear and it turned it sideways and then the cable was pulling back and it flipped it over on its back. He didn't get hurt at all. But that was ground duty. The barrier tests were ground duty. But they were fun. That was fun testing, too.

WRIGHT: Tell us about the relationship the pilots had with each other.

ENGLE: Very close. Very close relationship. It was very competitive, and particularly among the fighter pilots, and I think even among the bomber pilots. The test pilots it was, too, but more prevalent among fighter pilots. I think it was the fact that you grew up in a culture in the squadrons that you were the best fighter pilot in the world, and if you didn't believe that you were, you had no business being in that airplane. You had to be aggressive in aerial combat, very aggressive. Any sign of being timid or cautious normally gave the other guy an opportunity to gain an advantage in the dogfight.

So it was a very aggressive environment and competitive environment, but, on the other hand, very friendly, because I think everyone realized that you never knew when you were going to depend on the other guy to help you out in a situation. You might have a cockpit filled full of smoke and he might have to talk you down where you couldn't see, talk you down onto the runway. Or a gear condition where one gear maybe came down or didn't look like it was quite down and you relied on him to tell you whether you needed to bail out or whether you should try

and land the airplane on the lakebed. I think that probably was a very bonding consideration, that brought test pilots together pretty close.

WRIGHT: And it wasn't like Edwards is close to anyplace.

ENGLE: That's right. [Laughs] That's right. It's pretty remote. In those days it was even more remote. You had to get along, yes. You weren't going to get away from the guy anyway. Yes, we all lived right there on the base. It was a close-knit community.

WRIGHT: You were selected for the X-15 Flight Research Program on June 10th of 1963. How did you learn that you were going to actually officially be moved into that program?

ENGLE: Let's see. I think it was Colonel [Harold E.] Tom Collins who was the head of flight tests, both fighter bomber and cargo flight tests. I think he was the one that called me into his office and told me that I had been selected to replace Bob White when he left, and that I would start my training and transition then.

WRIGHT: October 7th was your first flight, so tell us about those three months of preparing for your first flight.

ENGLE: Very intense. One of the things that the X-15 initiated me to was simulators. We really had not had good simulators in the airplanes prior to that. It was all going out to the cockpit, getting cockpit checkouts, either dual aircraft rides or chase rides, as I explained. The X-15 had

a simulator that, although crude by today's standards, was a pretty advanced simulator at that time. It didn't have good visuals at all, but the controls and the dynamics of the controls were all very good, because it was actually just a full-scale iron bird that had cables, hydraulic lines, everything duplicated to the airplane so that you got the same responses to the controls and control surfaces as you do in the real airplane. It had a very rudimentary set of displays, but no ground visuals, so you couldn't land it.

We did all our landing practice in F-104s, which could replicate the X-15 very closely. But we were able to study both systems failures in the X-15, which was important in that airplane, because some of them could be very, very important to you. And we also could see and learn, or be initiated, at least, into the dynamics and the implications of either drifting too far off of any parameter when you were outside the atmosphere and returning to the atmosphere, see how really fatal that could be. So it was a very, very good simulator for teaching a new environment of flight.

Back up just a little, to the Aerospace Research Pilot School. If the test pilot school to me was like a master's degree, then the Aerospace Research Pilot School was like a doctorate degree, focusing and narrowing and more specialty-wise in space flight, whereas the test pilot school was aerodynamic flight. I think the assumption was that all the people who went to the Aerospace Research Pilot School had been through test pilot school, so they had the aerodynamic flight-testing course all behind them. The research pilot school focused more on space disciplines, reaction controls above the atmosphere, orbital mechanics, rendezvous, docking, things of that nature.

The Air Force designed that school to prepare people to be ready to go fly in space, and they selected people to that school for that reason. They had several programs in mind. The

Dyna-Soar X-20 Program was on the books at that time, as was the MOL, Manned Orbiting Laboratory, and those were the two military programs that they were grooming people to go fly, plus grooming people to control those programs from the ground as well.

WRIGHT: How did you become familiar with the X-15 flight program, as you were part of a test pilot program at Edwards? What did you know about it and what had you heard? Why is it something you wanted to move into?

ENGLE: The X-15, it really represented the ultimate in aircraft flying and flight testing. It really did. It was still an airplane. It was still a stick-and-rudder airplane, and a very basic airplane, by the way, and yet it gave you the opportunity to reach speeds and altitudes that were so far beyond any other vehicle at that time, or now, even. Well, with the exception of the [Space] Shuttle, of course. It had all the elements that pilots, in particular, I think, test pilots really crave, and that is a small, tight cockpit, single-seat airplane, nobody else in the airplane with you, operating in a performance envelope and environment that is well beyond what anybody else is flying in, getting meaningful data in that environment, where you can't get that kind of flight test data. You can't get that kind of aerodynamic data, even in wind tunnels because of tunnel wall effects and things like that.

I guess the bottom line is being able to be part of a very, very meaningful flight test and development program and airplane. I think we thought of the airplane more than we did the program then, because at that age—but in retrospect, it was the entire program, and I realize that now. It was a phenomenal flight test program and a classic demonstration of cooperation

between two different agencies, between NACA [National Advisory Committee for Aeronautics], when it started, but then NASA, and the Air Force. Just a classic cooperation.

WRIGHT: Tell us about the few days right before you took your first flight in the X-15.

ENGLE: Oh, total anticipation. I mean, no concerns, no anxieties at all. I do remember going down to NASA [Flight Research Center, Edwards, California]. I had a motor scooter at that time, a little Lambretta motor scooter, and I remember driving across the back desert roads from the housing area down to Dryden [NASA Flight Research Center], and sitting in the simulator, and just kind of like my cockpit in the sandpit back home, just sitting in there and flying and imagining, going through the profile, that first flight profile. Being down there, actually, whenever I could get any of the simulator operators to be there. Even on weekends we'd go down and go through.

I thoroughly enjoyed it. I didn't think I'd every enjoy flying a simulator instead of an airplane, but I did, because I knew it was going to be a demanding airplane to fly. It was a great airplane. It was just a wonderful aerodynamically stable airplane at low speeds, so, really flying and landing it basically was not a real hard task. The fact that you continually operated at the edges of the speed and altitude envelope with the X-15, because that's what it was designed to do; go find out where the edges were, that made it a very intense flying task. But prior to the first flight, it was strictly one of getting as ready as I could be, to not make any mistakes.

It turned out, on the first flight, there was an electrical malfunction that actually took away all the instruments, except the G-meter [gravity meter] and the pressure altimeter and the pressure air speed, which only operate down at lower speeds. So, having gone through those

profiles and just learned them verbatim, knowing what all the different cues were when you came back down, what attitude to hold, because there wasn't any angle of attack, but the nose just a few degrees above the horizon and then when you got there, so many Gs build up, and then push over and then slow down until the air speed worked.

That actually paid off, because that happened on the first flight. Like anything else, if you're ready for it, it's fun. You're looking forward to the next failure. You're looking forward to the simulator operator to give you your next failure. [Laughs]

WRIGHT: During that first flight, you opted to take the aircraft into a slow roll. Could you share with us what led to this maneuver and what was the reaction in the control room?

WRIGHT: You bet. That was something that, quite honestly, I had not anticipated doing. I didn't think one way or the other whether it was the right thing or the wrong thing to do. I was a fighter pilot, and maneuvering in airplanes is something that you just do all the time and think nothing of it. A roll is one of the more benign maneuvers you can do. Because of the other failures, I had been concentrating in the cockpit on the G-meter and watching it come up.

So when I got pushed over and looked out—I had never been that high and that fast before, and I looked down at the lakebed where I was going to land and it looked like it was really under me and passing by in a hurry. Overshooting was one of the things you don't want to do, because you can't get back to the field then. Also, pushing over to a negative angle of attack, where the air is coming from the top of the wing rather than the bottom of the wing, because in that condition, that was one of the conditions that the X-15 became unstable. I had learned that

in the simulator by being exposed to that and actually being told, you know, this is one of the things you don't want to do, is get negative angle of attack.

So instead of pushing over to get the nose down into the denser air, I had rolled the airplane, and it was just crisp, it was a beautifully flying airplane—and, I mean, banked it. I just rolled it over and pulled the nose down and let it dish out to get the nose pointed down, heading down into thick air, and got the speed brakes out and it slowed up, and really didn't give it a second thought. Landed. Didn't give it a second thought other than, "Boy, this thing really is a nice flying airplane," and landed.

It came up at a debriefing. One of the engineers came over to me and said, "Hey, you didn't roll that airplane, did you?"

I thought he was kidding. I said, "Who, me?"

He said, "I didn't think so." And it dropped.

And what had happened, they didn't have real good instrumentation in those days either. The roll angle would go out to 90 degrees one way and 90 degrees the other way, so the trace on the oscillograph went out and then started on the other side and came back in. They thought it was a drop out of data at first. I didn't hear anything about it for about a week, and then they developed the film that the little camera that looks out the back of the window and it showed the roll.

That's when I guess Paul [F.] Bikle called [Robert A.] Bob Rushworth, who was the senior X-15 pilot, and told him.

Bob called me and he said, "Did you roll that airplane?"

I had to think about it. I said, "Yeah, I guess I did."

And he said, “Why?” And I told him why. [Laughs] And Bob said, “Oh, okay. Well, I’d have done the same thing. Let’s go down and explain that to Mr. Bikle.”

So we went down to see him, and he was very stern about it. He said, “Why did you roll it?”

I told him why, that I was concerned about overshooting; I didn’t want to go negative angle of attack, so I rolled it to dish the nose out. And Paul was a pilot, too, and he said, “Oh, okay. It makes sense to me, but don’t do it anymore.” He said, “The rest of the guys are going to want to do that and we don’t want that.” [Laughs]

WRIGHT: It’s a good thing you did it on your first flight.

ENGLE: It was a very good thing.

WRIGHT: It was just a month later and you got to have another flight in the X-15. Was that pretty routine to start flying that soon and that often?

ENGLE: Yes, it was. We had four pilots. Normally, during the summer months there would be at least one, sometimes two flights a week, and we would rotate among the four, two NASA pilots and two Air Force pilots. Flying about once a month was fairly normal, unless you were preparing for a very demanding portion on the envelope, like a high-altitude flight. Altitude build-up flights would come in a series and they would schedule you weekly on that—it seemed like weekly—to keep your proficiency peaked out.

We could practice the landing with an F-104; we could put the landing gear down, the speed brakes out, and the flaps out, and come to idle, and it glided very, very similar to the X-15. In fact, the 104 was an ideal chase airplane for landing for the X-15, and you'll see that in that article there. It just matched up perfectly on both the speeds and the angle of approach and the touchdown speeds and all. So the landing was not so much of a concern, because you could really brush up prior to flight with F-104s. You could go fly a lot, two, three, four times a day if you wanted to, to practice landings on the up-range lakebeds, the small lakebeds up range.

But the altitude control and altitude and reentry and the failures that could occur sometimes, you couldn't duplicate anywhere else, so flying once a week was a good idea, and particularly build-up flights, where you'd see the initial indications of rarified air flying and reentry. Then the next flight would be even a little higher, and the next one a little higher. So you tended to be farther ahead of the airplane and keep the deviations much smaller on the very demanding flights into space.

WRIGHT: Being part of the X-15 program, were you restricted to certain planes or how often you could fly?

ENGLE: No. No, that was another good thing. I think restricted only because of the time constraints. As you prepared for a flight, you naturally focused more on flying the F-104 and practicing landing patterns. You knew what ground track you were going to fly, so you'd go up range and the designated emergency landing lakebeds, you'd practice landing on them, because some of them were fairly short, very short, as a matter of fact, very small. You could just barely squeeze it in, fit it in, if you had an emergency landing there.

WRIGHT: I know on one of your flights, the next year in July, it was postponed twice before you were able to take that flight. What were some of the reasons that flights were postponed and how did that affect the pilots?

ENGLE: They could be postponed either for weather or for systems problems. Inertial platforms were not very reliable in those days, and sometimes an experiment that you were taking up and flying would not be ready for flight and it would be delayed. Weather did play a big factor, because you had to have visual contact with all the lakebeds that you might possibly land on. Those were the main concerns.

WRIGHT: You just mentioned the experiments. How much knowledge and how much preparation did you have to know and to prepare for those types of experiments, whether it be for exterior or—

ENGLE: I remember an off-line story of that, with the X-15. Remind me of that after we talk about our instrumentation.

But your question, I believe, was how much preparation or how much work was required for the specific experiments that were taken up. Normally, the experiments were either autonomous or transparent to the pilot in the cockpit, other than putting those things at the right conditions, either the right Mach number or the right altitude or attitude or speed or whatever. So from the pilot's prospective, the flight profile—the experiments determined what the profile would be. You were given the profile to fly and told the reasons why, but you were given the

profile to fly with the priorities. In other words, if you had something go wrong and you couldn't get all of those conditions right, you knew which ones were the most important, if you could get those, to make it the most efficient possible.

So whether it was a pod on the wing tip, which measured, oh, for example, particles at different altitudes, types of particles, types of air, at different altitudes, or whether it was, we had a small instrumentation bay or box, really, right behind the cockpit, and a lot of times experiments would be put in there. There was actually little miniature payload bay doors, each door about that big [gestures], and they would open up and expose different types of cameras and instrumentation that were in there.

A lot of the altitude flights involved measuring the Earth's horizon and getting a signature of the spectrum of the Earth's horizon in different wavelengths—infrared, ultraviolet—so you'd climb up above the atmosphere and open the payload bay doors, and then since you were above the atmosphere, it was just like the Shuttle; you could go any direction and float around up there, for a very short while, but at least for a while, and open the doors and then sweep these cameras back and forth through the horizon at different sun angles so that you were able to then, for the engineers, get the signature sweep of the horizon, as you left the horizon and went into space.

The purpose of that was for guidance systems, initially for ICBMs, but then later on guidance systems for different satellites that use the horizon for attitude control, so that that signal comes back into the sensors and the sensors say, "You're getting too low, so drift it up." It will control attitude very accurately.

So the various experiments determined how difficult the profile was to fly, but you really had not too much interface with the experiments normally. Now, later on, later on we did, in that

from inside the cockpit, you could change the position of a switch and your guidance needles would go not from the airplane attitude control, but to the experiment, what attitude you should fly to zero in the attitude on the experiment.

In that, in fact, we learned a very painful lesson when [Michael J.] Mike Adams was killed in the X-15. That was determined to be the reason, was that he was getting data above the horizon. Then when he set up to reenter, he had not repositioned the switch back to the reentry position so that the airplane was lined up to land. It was coming in at a very big yaw angle and it just went out of control and broke up. So we learned a very painful lesson there on using one instrument for a multitude of tasks.

WRIGHT: On one of your flights, it was aborted ten minutes before the launch from the [Boeing] B-52. What are the dangers of aborting a flight during that stage, and what made the decision to do that?

ENGLE: There really normally was not a big danger. Aborts like that normally would happen because either the inertial platform would not come up to speed correctly, or a tank pressure would not hold, a valve would not close and tank pressures would not hold, or an auxiliary power unit either was running unstable or wouldn't crank up initially anyway, something like that. So it was reasons why you should not proceed with the flight, and if that happened, we were able to dump all the propellant in the X-15, vent it out the back end. It took a while, but you could. It took a couple of minutes to vent it and clean it up, but you could get rid of all the volatile fuels. Then you came back under the wing and you landed like a bomb out on the end,

on a pylon on the wing, which was a very helpless feeling, but nothing particularly dangerous about it.

And weather could do it, too. If clouds came in and covered up your view of a lakebed below you so that you weren't able to—if the engine quit, you couldn't visually pick the lakebed out and head to it and land.

One flight I recall, Bob Rushworth and I were sitting in the suit-up van, and there was some weather, but also they were having trouble bringing up the inertial platform, and it didn't look like things were going to come together in time. Bob and I were sitting there drinking coffee and had come to the conclusion it was getting too late in the day, because you had to launch by a certain time so that if you did have to go into a lakebed, they could get the recovery forces up there and get you picked up before it got dark. So there was a cutoff time, and we were rapidly approaching the cutoff time and drinking coffee and, I think, talking about what we were going to fly. We were going to go fly something today, because we were all geared up to fly anyway.

We were just about ready to leave the trailer, and they said, "Well, I think we're getting ready. We're going to make it okay. Go ahead and get suited up." Well, suiting up is like suiting in a spacesuit, really. The biomedical leads were already hooked up and into the suit and getting zipped up, and in that suit they had to screw some things down. Then once you got in the suit, got in the airplane, it was one hour for ground checkout to be ready to go and then taxi out, and then an hour and ten minutes up to the launch point and come back. So it was a pretty good time duration.

And I no sooner got in that suit and they started zipping it up and I thought, like I did just before I left, "Boy, I've got to get rid of some of this coffee." [Laughs] We didn't have any

urine collection devices like we do now. You just toughed it out, because it was a ten-minute flight, you know, so you don't need anything for a ten-minute flight, and an hour up there. But I really needed to go

And Bob, you know, he was no help at all. That was one of those times when fighter-pilot humor kicks in, and he said, "Hold it. Just hold it. Tough it." Boy, I went out and crawled in the cockpit and they were strapping me in and cranking things up, and it was an hour there, and I was getting really hurting. Finally, we taxied out very slowly and finally took off, and it was an hour and ten minutes climbing out.

Well, Bob was my chase at launch. He had an F-104, and we were rolling around and just rolled out on a heading back into Edwards, and the emergency lakebed, if you come off the hooks and can't light the engine, then you have to dump the fuel right away and dive right into that lakebed, and you can just get rid of the fuel in time to land. We rolled out and there was an undercast. The weather had moved in, some clouds had moved in, and it should have been an abort situation. So we rolled out, and the call from the ground to the X-15 pilot first and then to the chase pilot to verify that you got the launch lakebed in site, and I knew that I was not going to make it another hour and ten minutes back to the field, so I looked out and saw the cloud cover and I said, "Rog, got it in sight."

And I saw Bob pull up in the 104, and he unhooked his mask and he looked at me with a very incredulous look on his face, and I looked over at him and I gave it the coffee sign. And they called and said, "Chase, you verify that the lakebed's in sight?" And I just prayed that he would back me up on that, and he did. [Laughs]

He said, “Rog, got it.” So we went ahead and launched, and that meant it was only ten minutes back to the lakebed instead of an hour and ten minutes. After I landed, I had the cockpit open when the guys got out there to unstrap me, and I just about filled that lakebed up. [Laughs]

WRIGHT: We’re all glad that it worked out fine. [Laughs]

ENGLE: Aren’t we all.

WRIGHT: A really, I’m sure, spectacular memory of your career is on June 29th, 1965, when you exceeded the Air Force’s fifty-mile threshold that qualified you to receive your astronaut wings. Tell us about your thoughts at that time when you knew that you’d reached that limit.

ENGLE: I think the most important thing to me on all the flights—and particularly on the X-15 flights, because they were very visible from the pilot’s standpoint there at Edwards—and so the most important thing to me was to fly an accurate profile, and that was very difficult to do, because for altitude flights, so many variables going uphill could affect what your top altitude was, your peak altitude was. A one-second overburn with the engine or underburn in the engine would make a difference of 3,000 feet, and a 1-degree pitch attitude variation could do the same, that much difference. So it didn’t take very long before you really overshot or undershot your altitude, and the instrumentation and the stuff we had to use at that time, it wasn’t a little pointer that counted down to shut off now. You had a clock that started when the engine lit and you would shut down on burn time rather than on attitude, because the inertial platform wasn’t really

that accurate. So, flying an accurate profile was the thing that we all strove hard to achieve. It meant a lot to all of us.

That flight was planned and programmed to go over fifty miles, and I was looking forward to it and excited, because it was going to be a threshold accomplishment for me, too. But I honestly recall that more important than going over the fifty miles was getting as close to that planned altitude profile as possible, and I think the fact that it came out very, very close meant more to me, really, than the fact that I'd gone over fifty miles.

You could make sure you got into space by letting the engine run another second or two, and that's a nothing time, you know; one second is nothing. Or just squeaking a little bit more on the pitch attitude and by the time the ground could see it on radar, it was too late to do anything about it then, because then you're ballistic going over the top and you're just along for the ride then. And a lot of times, people would err a little bit on the conservative side to make sure they got high enough and all that.

I knew that I'd have other opportunities to do it, but that was a big deal, and the fact that my parents were able to come out for the flight and be there. They took them out on the dry lakebed after I had landed and they got to come right up to the airplane. That, I think, overshadowed the idea of going into space, really.

WRIGHT: How exciting for them, too.

ENGLE: Yes, very much so.

WRIGHT: You received your wings at a ceremony at the Pentagon the next month, by the Air Force Chief of Staff, at the same time [James A.] Jim McDivitt and [Edward H.] Ed White [III] received their wings for the Gemini IV mission. Tell us about the ceremony and the exchange of information that you had with the astronauts, being with them at the same time.

ENGLE: Well, Jim McDivitt had been at Edwards at fighter test ops when I was there, so we knew each other. I didn't know Ed. Ed had been through the school, but I think Ed had been assigned to Eglin [Air Force Base, Florida], I believe, before being selected by NASA. But I knew Ed, knew them both. I was thrilled and, and to be honest, I was a little hesitant to rain on their parade of getting their astronaut wings, but I think what happened was Secretary [Eugene M.] Zuckert, the Air Force Secretary, had some kind of a schedule conflict, but wanted us all there at the same time. So I was really honored.

Initially, there was an awful lot of good-natured and some maybe serious rivalry and barbs going back and forth between the Edwards pilots and the NASA astronauts, but I didn't sense any of that at all. I think it was just three Air Force officers had qualified for their astronaut wings, and at that time, you got to go to the Pentagon to get your astronaut wings. I think the fact that there were three of us happened to qualify at the same time was the overriding thing. Jim was interested in what was going on back at Edwards, so it was a good time. Everybody had a good time.

I do remember that I still had my basic pilot wings. I didn't even have the senior pilot wings, the ones with the star on, and then the command pilot has a star and a wreath on. I had not had enough time in service, rated number of years to qualify for the senior pilot, so I had just

the slick wings. When they were getting ready to present the wings, I must have been scowling at them or something, and one of the officials there said, “These are yours.”

“Well,” I said, “you know, I’m not qualified for those yet.”

I think I had another four or five months to go before I had enough time in grade. He said, “We’re going to waive those requirements so you can go ahead and have these.”

And Secretary Zuckert saw the discussion and he came over and he said, “Is something wrong?”

He said, “Well, Captain Engle just pointed out that he’s still a basic pilot, but we’re going to waive that requirement.”

And Zuckert—he’s a neat old guy—he said, “Well, is that what you want?”

I said, “Well, sir, I’m just a pilot.”

He said, “Well, do you want your pilot wings?”

I said, “Yes, sir. I’d prefer that,” because I knew I’d get the senior pilot in a few months anyway, and nobody’d every got the other slick-wing pilot astronaut wings, and nobody has since.

So he turned to the guy and he says, “Well, we got a pair of those?”

And he said, “Well, no, sir. The only ones we have are in the display case out there in the hallway,” in the Pentagon.

Zuckert said, “Well, go get them.” [Laughs] So I was really glad that he did that, because I got to have my slick-wing astronaut wings, the only ones that have ever been given.

WRIGHT: You were able to repeat your achievement just six weeks after you broke the threshold the first time, and then once again.

ENGLE: And that kind of fell in line with what we talked about a little earlier and that is the proficiency in a particular profile. Once you have built up to a high-altitude profile, if there are a series of flights that require a profile that goes to a certain altitude, sometimes it was better to let the guy who has already built up and is flying at that altitude to go ahead and fill out that series of test requirements. I'm sure that that was the reason that I had the other opportunities to fly.

WRIGHT: The last time that you piloted the X-15 was October 14th, 1965, which just happened to be the anniversary of Chuck Yeager's breaking the sound barrier. Had you stayed in touch with him the years after he first admitted you into the program? Was he still around?

ENGLE: Yes. Oh yes. You bet. You bet. In fact, when I was in school, Chuck was instrumental, as we said very early, in my getting over to Edwards, or helpful in my getting over there. Once I got over there, I really got to know him over there; I didn't really know him at George [Air Force Base]. But he invited me to go hunting with him and backpacking up in the Sierras [Sierra Nevada Mountains] with him. He would take those two-week backpack trips up there, and flying. We would fly; we both flew with the Confederate Air Force down here in Harlingen [Texas] at that time—Mercedes [Texas] at that time. And we started doing a lot of things together, and I really got to know him well and got to enjoy him very, very much. He exposed me to an awful lot of things.

In fact, he took me up to the Winter Carnival at Lake Placid, New York, which is kind of like a mini Olympics. You all may be familiar with that. I wasn't. But it's a weeklong series of competitions, skating and skiing and bobsledding. We got there late at night. Chuck had been

there the year before as the King of the Winter Carnival. He wanted to go back again because he had such a good time, but he couldn't be a king again. So he told those guys that he had somebody to be king, if he could be the bishop. So we got in his [Martin] B-57 [Canberra] that he had at Edwards and we flew back there and got in late in the evening because of the weather, I think it was. The guy in town that rented snowmobiles knew him and said, "Well, the reception has already started out at this guy's mansion out in town, but why don't you take a couple of these and go on out there."

Chuck said, "We'll take a couple of these and head on out. Don't call him to come in." So we went cross-country over the snow and ended up out there.

Then the next day, they were showing us around to all the games. Well, we happened to go by the bobsled run and we were looking at that. It looked like a lot of fun. They said, "Would you guys like to go down the bobsled run?"

We, of course, said, "Sure." It was run by the New York Park Service, and they had a clunky-looking four-man bobsled that had roll bars over the top and protected you, and they had a driver and a brakeman, and they would take two people in the middle just to show them what a bobsled run was like, and they'd drag the brake most of the way down to keep going fairly slow.

So they had Chuck and me in the middle, and Chuck—that's not where he likes to be. He likes to be flying and driving in the front seat, so we ended up coming down, and we got out of it, and the guy who was running the games there said, "Well, how'd you like that?"

Chuck said, "Oh, I think we got the hang of it, don't you, Joe?"

I said, "Yes, sir."

He said, "You got one of these two-man things that we can try out?" And they didn't really know how to react, but it was Chuck Yeager, so they didn't say no. So Chuck and I got to

borrow a two-man bobsled and we started down and we got to the top—and Chuck, of course, was a colonel then and I was still a captain then—and he says, “All right, here’s the deal,” he says, “I’m the driver, you’re brakeman, and don’t you touch that damn brake unless I tell you to.”

So I said, “Yes, sir.” So we tried to push off like we saw the other guys doing, you know, you run and you jump in and you fold the little things in. Well, we looked like a couple of bear cubs playing with themselves in there. We finally got scrambled in, we were barely moving, but we picked up speed as we were coming down, and I was not about to touch the brake, and Chuck was doing pretty good, and we came to the one zigzag maneuver, which it just happens so fast—it’s instinctive maneuver; you can’t control it—and he almost got it right, but we came out on the backend a little high and the sled rolled over and tumbled and started and we spilled out and it tumbled down. Chuck was sliding—he was in front of the sled and I ended up on the uphill side of it, and the sled between us, just sprawled and sliding down. Neither of us were hurt, but he would look around, and I could see him looking back, and he says, “Come on, Engle, you’re going to ruin our time. Hurry up.” [Laughs] They only gave us one run. They wouldn’t let us make another run after that.

WRIGHT: That probably was good.

Well, our time is almost over for today, and I didn’t know if there was something else you wanted to add at the moment or if there is a good time to stop and we can pick this up again.

ENGLE: We can pick it up. I’ll tell you one more Chuck Yeager story.

WRIGHT: We always have time for that.

ENGLE: We have time for another Yeager story. We were heading back one time in a B-57 from the East Coast. We'd done something back there, given a talk or something. I can't remember. And Chuck should have been and would have been a great—one of these traders in the Dark Ages, where you went around the Cape of Africa and traded with the Middle East and brought silks and things back. He'd have really done well then, because he had this B-57 that belonged to the test pilot school, but the bomb bay had a big platform that would winch up and down. They used the bomb winches to let it up and down.

He let that down and loaded it up with lobsters up in Maine one time, and we started back and we stopped at Hamblin, West Virginia, which is his home, and we traded some lobsters for some hickory firewood. Then we stopped somewhere else and traded something—I can't remember where that was. Texas, for something. But then we stopped at Albuquerque [New Mexico] because he had taken an elk and had it cut up and processed—not processed, but just cut up and quartered. So we traded some of the lobster to this guy who brought the elk down to the airport. We loaded it in.

So we had this bomb bay full of elk and hickory wood and lobster, and we were taking off from Albuquerque, which is high altitude, and a fire warning light came on in one of the B-57 engines. I was in the back seat and didn't say a word. We climbed out, and finally Chuck got enough altitude, he throttled back a little bit, and the fire warning light went out. It turned out to be a sensor, but we didn't know at the time. He called back to me, he says, "Hey, Joe, you see that fire warning light back there?"

I said, "Yes, sir, I noticed that."

He said, "You didn't say nothing."

I said, "You were flying."

He waited a while and he said, "You know, if that'd been real and we'd a crashed, they'd have found all those great big elk knuckles and they'd thought we'd had the biggest knuckles of any two pilots in the Air Force." [Laughs]

WRIGHT: Great trip.

ENGLE: Great trip.

WRIGHT: So I have to assume you landed fine and had surf and turf someplace.

ENGLE: Oh, we made it from there back to Edwards, yes. Landed on a ramp and the guys came out and he would give stuff to the crew chiefs. He would give lobster and firewood and elk and keep some himself. [Laughs]

WRIGHT: Well, we'll close for today and we'll find a time and pick up again.

ENGLE: Okay. Sounds good.

[End of interview]