ORAL HISTORY TRANSCRIPT

JACK KINZLER
INTERVIEWED BY DOYLE MCDONALD
SEABROOK, TEXAS – 9 JUNE 1997

[This oral history with Jack Kinzler was conducted in Seabrook, Texas on June 9, 1997 This oral history was conducted by Doyle McDonald for the Johnson Space Center Oral History Project.]

MCDONALD: The first question I'd like to ask is how you came to work at Langley Field to begin with and then how you transitioned from there into the human space flight program while at Langley?

KINZLER: Okay. First of all my name is Jack Kinzler for the record. I was a member of a model making group in Pittsburgh, Pennsylvania during my high school days and it was very common for the model plane builders to be interested in aviation obviously. In respect to that we all sought after jobs working at Langley Field … Langley Research Center of NACA. That's the National Advisory Committee for Aeronautics. So I was employed after high school in a bank along with some of the other fellows in Pittsburgh. And I heard of a civil service job opening at Langley Research Center. So I applied and I got a call to come on in. And the job consisted of building model airplanes for wind tunnel research. And here we are since age twelve building models one after the other. About five, six, seven years of expertise. Also flying in national competition. We built free flying models of different kinds.

And to make a long story short, my modeling hobby led me into working at the Langley Center. So I signed on there as an under aircraft model maker which is a low paying job. About a thousand … twelve sixty … twelve hundred and sixty dollars a year. In those days we had to send money back home to mom and dad to help with the cost of living. And one of the interesting asides is my mom shipped a box to me with my clothes and laundry work. And she would always put cookies and things of interest in there. And I had a contact with my family, four hundred miles away, by mailing this laundry box back and forth. That's just a little side note.

But anyway, this model making activity became the opportunity for me to get my government job. And I loved it because at Langley field, they had a series of wind tunnels and different sizes. A purpose of a wind tunnel is to recreate the simulation of air flowing over wings and so on. But you have a plane in a static position where you can take data from it while it's non-moving even though the wind is going by it at great velocity. So with that kind of set up, they need model makers. We would build models. Anything from small … some of the wind tunnels had a four foot cross section of test section, others had sixteen feet of cross section and huge tunnels, as well as small. So I built models through the machine shop and I went through a five year long apprentice program teaching us how to become tool makers. And we call ourselves metal model makers, a little different than wood crafting in that you have to learn how to work with three dimensions in the machining processes. This is quite complicated using templates and contours and so on. So anyway, we began to build wind tunnels models in my career.

And after a while I advanced to section head over one of the group of outside machinists. That's a kind of a strange name. It comes from the shipyards in Newport,

Virginia. The regular machinists that work in the machine shops where there are rows of equipment. Those fellows are just qualified as machinists. But an outside machinists is a person who can take portable tools, machining type tools and go in the field like onto a ship. In this case into one of the wind tunnels and set up and remachine parts using portable tooling. Very delicate and unique system of working. So I had this crew of outside machinists and I roamed all over every wind tunnel and every facility at Langley for about ten years or more. And I spent twenty years there all together. And so the career developed through first of all building models and then secondly, I moved on to taking charge of a very unique group of men who worked individually using portable machine tools to do the things in tunnels that you could not do back in the base shop. So that's a quick story on my career at Langley.

MCDONALD: How did you move the equipment from the shop…the big models into the wind tunnel?

KINZLER: Okay, the way we did that. We had connections with a rigging crew and the larger objects were handled by another group of men who were official riggers they called them. And we used cranes. One of the things that I had charge of at Langley was replacing the huge wooden blades in the wind tunnels that drove the air around the tunnel. And whenever they would have a failure in the test section part of the model pieces would go down the tunnel street. It's a closed loop tunnel and these pieces of metal would fly down and ram into the blades of the wooden plywood fabricated blades and tear them up. So one of my jobs was to handle a crew of men who would first build all the new blades in the model shop than we

would set them into a hub that was part of the motor drive system in a horizontal position. We'd install all the blades in rotation in a proper order and position them just right. Then we would bore holes through the blades so we could bolt the blades to a steel hub. After that, we would dismantle this device and then we'd haul it off in bits and pieces to the wind tunnel facility. And there they had an overhead hatch that would open up at the roof top. They put an outside crane out in the outside and they would lift one blade at a time and lower the blade down through a hole in the hatch. And then they would drive bolts in; bolting that particular blade and rotate it around. And finally we would get…one case, this sixteen foot tunnel had two sets of blades, one was thirteen and the other was twelve, and we would spend three shifts around the clock on a job like this. And we would put all these blades in one at a time. Eventually we would reassemble the propulsion system within the tunnel.

Now the tunnel that I'm talking about, sixteen foot, had a sixty thousand horsepower motor which is pretty substantial. The drive shaft on the motor was about twenty-four inches in diameter. And you picture that standing on a large tower so that it's at the proper elevation with a horizontal shaft reaching through from outdoors into the interior of the wind tunnel. And then attached to that is this big steel hub that I described earlier that holds the blades. So you have a sixty thousand horsepower motor on the outside driving and then you have the shaft coming through into the interior with the blades installed on it. Well, that's typical of a wind tunnel job that we did with these outside machinists. You were talking about how do we do it. We would carry in portable boring bars, they call them. You can hoist the boring bar up into an elevation where it may be difficult to get to. But once you bolt it down, you can set up and it's like a portable machine in that if your boring holes for hub bolts, you can actually…it works like a drill. You drill holes and bore and you can hone. You can do

everything necessary like you would do in a machine shop but you do this in the field. So it's a real unique operation to tell you the truth.

Anyway, I handled this outside machinist group after I, earlier, built model airplanes for the test facilities. And the test models that we built had to have extreme accuracy. They were scale models. And there is a rule called the Reynolds number. And the Reynolds number relates to the efficiency of different sizes as to respect to the full size. So here we've got an airplane that maybe has a hundred foot wing span and we're building a 10^{th} scale, a ten foot span. If there's an error in our tolerances. Say the air flow has described plus or minus ten thousandths of an inch contour shape, that would relate back down to one thousandth of an inch contour shape in a model. You have to maintain the exact continuity of reference size. So building a all steel or all aluminum wind tunnel model is a very very delicate job. Are we doing okay? I don't know how much of this you want?

MCDONALD: How do you transition from that into the space program itself?

KINZLER: Okay, I was an employee of one thousand technicians, crafts people scattered around the Langley Research Center. And I worked in the, what's called the, West Machine Shop directly across the street from Bob [Robert R.] Gilruth's offices. The Pilotless Aircraft Research Division [PARD]. And he knew of me and many others of course. But when he was made director of the space task group, he approached the Langley Research personnel and said I'd like to have key people assigned to me that can help me put together a complete service organization. So he asked me if I would come with him wherever he went with the space task group. And I said that I was happy to do that.

So I wound up being assigned as the technical services assistant to the director. And my charter was to come wherever we go, we weren't sure we would be coming to Houston and layout a complete technical services organization. This includes machine layouts in a shop, the determination of the number of technicians you need, and the crafts levels that should be covered. And then also coming up with budgets so that you could tell what kind of money we need to outfit a place like this. So he gave me complete charge and that's how I got started. I was on his staff.

MCDONALD: Did you assemble this team of people that you just mentioned at Langley?

KINZLER: Yes, yes, that's the next step. Once he gave me the charter to go ahead, I recruited people, mostly with twenty years or so experience, in the metal shops and the welding area and aircraft sheet metal fabrication, machine tool operation, and back over in the old model shop, wood working and plastics modeling. So I brought a crew then to Houston about…I think I had about eight or ten people in that time frame. And I brought those in with me and we then rented portable temporary buildings. But that's how I got started. I actually put together a group of old time craft people with much experience and started off with the equivalent to what was existent at Langley Research Center.

MCDONALD: And what was the first space flight project you did?

KINZLER: While we were still at Langley, project Mercury was in the beginning. It was the first one. And in order to achieve project Mercury, Max [Maxime A.] Faget and Bob Gilruth

and others, they had a design team right there at Langley. We still work…we actually we had a beginning even before that but I don't know where this is appropriate or not.

The very first satellite that was ever put into orbit by the U.S. was done out of the Langley and the JPL [Jet Propulsion Laboratory] laboratories working together and what it was a passive satellite. It became known as Echo. A one hundred foot diameter satellite. Well we built a twelve foot diameter one for starters. And I was on the team that did that. And a fellow named [William J.] O'Sullivan [Jr.] was the creator of the concept. He figured that we could take very lightweight thin plastic and make it into a sphere…spherical shape. And then we could use a method of expanding it into a full diameter balloon type shape after it's prepackaged in a small little bottle. And the one I worked on was a six inch sphere. And I've got some pictures of some of this. And I know that you're using pictures.

We went out to JPL and we used our pressure bottle that contained this little 12 foot diameter sphere…plastic sphere. And we prepared it and then went to the Cape and worked with the…I guess it was the ABMA [Army Ballistic Missile Agency]…the people that had the Redstone missiles and so on. They prepared a launch device for us. And we launched this 12 foot diameter sphere out of the Langley group of people…with the Langley group of people. And it was successful. It opened up and it deployed itself into a nice perfectly round sphere. We tracked it with the radar and so on. And out of that, came the one hundred footer which followed immediately after. Now this is in NACA just leading into NASA [National Aeronautics and Space Administration] in '58, '59, in that period. So here we are a bunch of so called space people that came out of the aeronautics realm. And we had our first kind of getting our feet wet with this twelve foot thing and then we went to the Cape [Cape Canaveral, Florida] with a hundred footer and put it up. So that was an aside but it really it

leads into some of the beginnings. Working with Bob Gilruth and his space craft design. His pilotless aircraft research is what he called it. Did anybody tell you about it yet? The technique of using pilotless aircraft.

MCDONALD: No.

KINZLER: Well I'll take just a moment on that. You can extricate these things and put them elsewhere. In the case of Gilruth, he had a staff of engineers and they used Wallops Island, Virginia to do their testing. And they would fire small scale model rockets at high velocity. And they wanted to try to get through the speed of sound with breaking the sound barrier and still gathering data. So they build a model of a wing of an airplane and mount it on a rocket and they would add telemetry to it. Which is the radio telemetry. They would launch it vertically and as it reached through the speed of sound, the telemetry would send back the pressure distributions over the wing and how the air was flowing and all that. So he was the first guy to come along with an alternate way of getting a transonic test. In another words, achieving a test of that sort.

So that was the beginning, with that operation ongoing, they could begin and "Maybe we can get a man in space and fly somebody for real." So they designed the Mercury spacecraft. The very first model in Langley at the Pilotless Aircraft Department across the street from our shop. And I had my little team of guys together about that time. So we built a … what we called a boiler plate where a less fancy spacecraft called Big Joe Mercury. And it had the dimensions and the exterior appearance of the follow on McDonnell Douglas Mercury capsule. But it was a precursor to that and we took it to the Cape and we launched it

on a Redstone rocket with assistance of the people down there. And we actually successfully proved out the escape tower idea. And several things that were unknown. We made sure the heat shield worked right and that sort of thing. So that occurrence took place why we were still at Langley. We were riding back and forth to Cape. We were not yet in Houston and so on. Now I'm going to drift quite a bit here.

MCDONALD: Did you build this boiler plate equipment at Langley?

KINZLER: Yes, we built it at Langley in the shops. And then … believe this or not. We were so primitive, we had to go to the Cape and get this vehicle that we built down there. We got a GSA [General Services Administration] truck, an old cast away flat bad truck. My technicians loaded this spacecraft we built on the truck and we drove it to … Langley and…down to the Cape Canaveral. We had it sitting mattresses and strapped down with ropes and so on. And we arrived down at hanger S where they have the spacing area for us. And what do we see. We see the great big … I said Redstone but actually it was an Atlas that we saw. Big, beautiful Atlas launch rocket. It [was] sitting in a custom made dolly, you know, about a hundred feet long with all these special protuberances. And so we went ahead and we said, "We can handle this, all right." So this story goes on a little bit further but not too far.

The day came to erect our homemade Mercury spacecraft. And we drove out to the launch pad with this flat bed truck. And I had mounted…we sent over to…where did we go? We bought a mattress and laid the mattresses down between sheets of plywood and made a soft mounting for it and tied it down with straps. And drove out to the launch pad following

this super-duper Atlas. Going out there…you know, the regular parade…here we go and there they go. And they launched…they picked the Atlas up and erected it and then they reached down with their big lift hook and took our little Mercury capsule model off and put it on top of the Atlas. And that's early space age, believe me. Now I've been drifting quite a bit here but we're talking really about what happened out of Langley. We're still in Langley and we're running back to and from…the space task group is in effect going. And I'm commuting…we had a contract with an airline to shuttle us back and forth. And we had our own shuttle so you could say, "I want to get on the Monday shuttle. I'm coming back on Tuesday or Wednesday or" whatever. And so we would fly into Houston and stay in a motel. And then we would go shopping for spaces where we could rent a room to build a temporary shop. Should I go on with this?

MCDONALD: Yeah, this is how you came into Houston?

KINZLER: Coming into Houston, the first thing that I found out was the GSA had charge of rental of any government type purchases of facilities. So we found out how to go about doing this business and they said, "Well, we think they're some buildings along the Gulf freeway that you might use." And I found an empty bottling plant down close to downtown Houston. Just a big empty building. So I arranged to rent that. And then I had a second opportunity to get another building out near the Hobby airport…And we arranged to get that building. And between those two, we set up a complete machine shop, model shop, sheet metal fab. And just about everything we had in minimum content. Like one or two lathes rather ten lathes

and so on. But we had the elements of a shop support service in rental buildings. And we did that for quite a while.

And while we were doing that, I'm flying back and forth to Cape Canaveral because we were also, in the same time frame, doing this other thing I described about the Big Joe capsules that we built. So we worked out of hangar S in the Cape and we worked out of the Canada Dry building, it's called, in Houston, and the Rich building. And we had…and Langley…and we're still using some of Langley help. So it was a triangle if you can imagine this. And we're talking about 1961, '62, in that time frame. We had shops at Langley that we could get things done at. I had my own shops out in Houston. And then I went down with a group … a crew of workers to the Cape.

And we actually managed to coordinate enough so that we actually prepared and launched successfully some of our early prototypes. And these were very important because then we weren't sure how the heat shields would work and we didn't know about the safety aspect. You may or may not have heard about how we decided we had to have an escape tower. We had … previously they've launched all sorts of objects in the military like ballistic missiles but they didn't have to worry about life situation. So here we had our designed Mercury capsule and we're going to put a man in it. And it became very apparent that on prelaunch, prior to launching, there's always a chance you'd have a misfire and you'd have something go wrong. And you'd have to save the astronaut who's up at the very top in the capsule. So they designed a thing called an escape tower. And I had a hand in that.

When we're still at Langley, the Mercury capsule was coming along under it's earliest design. Max Faget approached me and he said, "Do you suppose that you could build a scale model of the boiler plate?", we call it, they were going launch later at the Cape. He said, "I'd

like to have one that can help me determine if I could put a solid rocket on the top of a tower and I can fire the rocket motors and I can have the thrust coming out of the rocket motors like I need to lift an object but I must deflect the thrust so it doesn't burn out the space craft that's on top of them. So I said, "Yea, I think I can handle that." So I went in and made my own drawings and I had our machine shops build up a model. And it had nozzles set on an angle. About ten degrees, fifteen degrees, twenty. The object was, when you light this solid rocket, it would deflect the flames out on an angle. And they weren't sure whether they needed as little as ten degrees which would be maximum thrust or a whole lot of angle like twenty or thirty degrees. So we launched a whole set of these out of Wallops Island. And each one had a different thrust angle. And they used high efficiency film footage. They could actually take pictures from Wallops from the ground and they got pictures of the flame patterns of the different rockets with the different nozzles. And that was actually my first job for the space test group was designing this little gadget. And that worked successfully. They wrote specifications. They said, "The Mercury spacecraft shall an escape tower and it shall have a certain amount of thrust built in the rocket motor. And it also has to have a safety feature, in that the angle of the rocket exhaust shall be no less than twenty degrees off the vertical." And that would deflect it. So there's a little side kind of thing that we did.

Now where was I? I was out in Houston, I guess, talking about rental buildings. After we rented the first buildings in Houston, we then had an opportunity to move into Ellington Field. They gave us a huge hanger. And it was called hanger 135. And that was just a big empty building. You know how hangers are. So we were able then to move all of our equipment out of these rental buildings over into Ellington. And meantime another job I had to do. We had chosen to build the space center in Houston so I was asked to describe all

the facilities for the technical services department. So I starting working with the architects. And I made sketches of the buildings with layouts. Similar to the thing I had been familiar with at Langley Research Center. And I laid out building 8, 9, and 10 which are on the back end of the site. I laid all those buildings out in a plan form. And I specified we had to have a high bay with big cranes that we could lift X number of pounds weight. And I specified basically the requirements for all the buildings that would be built at Houston in respect to what I had experienced at Langley. I'm a copy-cat in a way. But it was obvious I would do that. You know, it was something that worked.

MCDONALD: So you had control over the layout of the buildings themselves.

KINZLER: I sure did.

MCDONALD: Is that typical that people who are responsible for the function of that building to control the layout?

KINZLER: No, it isn't. It's an example of how the space task group works because normally you'd have a complete engineering department and architects onboard. And top management who is asking congress for money for something. They would handle a complete preparation of the building by themselves within an independent department. But in this instance, I just drew sketches of what I needed. We were a quick reaction group. And with my sketches, they bought them. They didn't try to build a building with sketches. But I was able to determine myself on a one-on-one basis that we had to have a certain size floor space. I knew

what kind of equipment we wanted to buy. I made up the list and turned them in and got approval to purchase equipment. And then I also had an opportunity to go hit the country and go to all of the government facilities and start recruiting people. I wound up recruiting over a hundred people to work in technical services division as part of my option. You must know this, without any further information from Bob Gilruth, I had no body directing me as to what I should do. This is self initiated. I initiated all of that as one person And the help I got, of course, I'd go over to the engineering department guys and say, "Hey, this is what we need." And they would pick it up and work with it. But I didn't have any chain of command. I reported to Bob Gilruth as his technical services assistant. And then they named me Chief of Technical Services division as we created the division.

MCDONALD: Now you said that you recruited these people from the government?

KINZLER: Yes.

MCDONALD: They were all civil servants?

KINZLER: Almost all civil servants to start with. We held back on going to industry because in industry, you find, like in machine shop, you find trained operators. They know how to run a lathe or a milling machine or selective part of a work. If you go in the government research and development arena, you find technicians, like myself, who were taught how to run every machine that is used in a complete department and who can read blueprints, interpret, and also can give instructions to the designers as to which choices to make.

Whether you should weld something or machine it. So we were a different cut here. These people that I recruited were individually quite talented and they mostly had twenty years or better experience in their craft. But they almost all came out of the Lewis Laboratory [NASA Lewis Research Center] in Cleveland which was in NACA in the early days, still. And they came from Ames Lab [NASA Ames Research Center] in California which is another part of NASA. I got some from…the Naval Research Lab [Naval Research Laboratory, Maryland] had a research department where they used craft experimental people. And so I went searching for technicians that were above average. Now with the result of getting those and bringing them in, we had a jump start. I mean, when we went to work, we knew an awful lot about how you do things. We weren't inexperienced.

The other thing I started was an apprentice training program. Which I was a product of the one that the government had out in Virginia and at other centers. And we ran it so that we could bring in some additional young people in and let all of our experienced older guys pass on and teach some of these younger guys how to do this work. So we ran a five year long apprentice program for quite a few years. And that's one of the things that I felt very badly about when we came to crunching numbers and so on. I was told that we no longer use an in-house training apprentice program. We dropped it. And we'd had run people through five years and had to turn them loose out on the street and let them go find jobs in machine shops. A very sad thing. But there's the first gripe, you might say. I've been pretty good so far. But truly, I was dedicated to the idea of in-house training. To me, I came through it, I saw the benefits of it. Everyday, day in and day out, our shops were open to walk in design engineers who would visit with the machinists and the metal smiths, chat with them, learn from them, back cross-talk, and offer suggestions. And we wound up designing things that

were excellent as far as manufacturable. And we lost that in recent times. We now have contractors, in most tech service support areas, and the only problem with them is they generally have come out of industry and they don't have the broad base of knowledge of how many different ways you can do things. And I could send a guy from the model shop over to the machine shop and he'd been so rounded out that he could actually go over there and run a machine of that type. And so it helped my division be very beneficial to the space program, put it that way.

MCDONALD: So when you got this team in place here in the Rich building, what were the first major assignments?

KINZLER: Okay. Bear in mind that Mercury, Gemini, Apollo, Skylab all followed, one overlaying the other. From each of those, we built the original wooden models. Little small stuff…conceptual models. Then we would build wood mockups that would give them an opportunity to sit inside and decide whether the window openings they had planned would give them the kind of visibility they needed and that sort of thing. So we called those mockups. We would build wooden mockups for the programs as they developed. As we went from the Mercury models…by the way, Mercury models were tested in the wind tunnels at Langley. And we're back to the early thing that I used to do. We actually built precision wind tunnel models of Mercury for testing in the wind tunnels. And so the technicians that I had in Houston would…we build a Mercury type one man capsule in our shop. Not flight worthy. Just something that was dimensionally correct. Then we'd build a Gemini model. Two man which had different dimensions. And we did these in temporary buildings. And

finally we were getting ready for the moon … the Apollo moon program. As that progressed, we built the Moon Lander [Lunar Module] models in mockup form. And we did that.

In each case, a full scaled craft built module would be built that would allow the astronauts, in the case of the larger objects, like the Lunar Lander [Lunar Module], they would actually get inside of them and check out whether they could reach. Where the designers had planned a console. Could they read it? Could they reach the switches? When they look out the windows that face down toward the moon surface, can they see appropriately without having to move over or bend. They actually went through the training of being able to see how useful the design of the spacecraft would be with live astronauts in our shops, right with us. And if they didn't think something would work right, they would go to the design guys and say, "Hey, you're going to have to lower this window another six inches or we're not going to be able to use it." And so they would make on-the-spot decisions in our shop. The technicians would be told, "You know, can you change that." We'd change it. No drawings. We're talking about the preliminary now. And after we get something that was suitable to both the crew and the design department and our shops, we would then go on and build the item but not build a flyable one in this instance. These were mockups. But we did that while we were here in the rental buildings. We built a lot of these demonstration modules.

Also, there's another program we had that comes a little later. The Apollo…we had…no it wasn't later either now that I think about…it was in Mercury. Just an aside again. In Mercury, we had the design from McDonnell Douglas. The flight worthy design come through. But they had a problem with landing impact in the water. They realized that if we come slamming down in the parachutes and hit this bolted on heat shield, we are going to hit

awful hard. If we hit on a certain angle, we are liable to kill the astronauts. So as an in-house last minute thing, we decided that maybe we ought to disconnect the heat shield at the opportune time while we're coming down on parachutes and let the heat shields sag down another three feet or so. Put a rubber flexible boot around that holds…if you can imagine, a rubberized column of material bolted to the top of it…bolted to the underside of the Mercury capsule. On the lower side, bolted to the heat shield. And a device that lets the heat shield fall free. Okay. That was invented after the [original McDonnell design concept in] fact while we were out at Langley still. And that device made for a soft landing. What would happen would be the parachutes would deploy, the spacecraft would be descending on the chutes, and at the appropriate…like 5,000 or 10,000 feet, whatever it was…at a particular elevation, a sensor would turn loose and it would release the heat shield so it could fall down three or four…it was four feet. There were round holes in this rubberized thing so air would collect in the space, in a container. And whenever the heat shield smacked against the ocean, it would squeeze the air that was trapped and make a soft landing and the air would be pushed out. That device was designed by us. I say us. The NASA guys, not McDonnell Douglas. And so I had a lot to do with that. We built those heat shield suspension devices.

And McDonnell Douglas actually sent out designs that used turnbuckles. You know what a turnbuckle is? Well, they had some aircraft turnbuckles that were six inches long. They had a connection on each end and they were … the heat shield's about four feet in diameter. Well, everyone of these fabric sections, that was going to be connected, was connected by a cable. So they had to fold in a dozen or more of these six inch joiners. And we were running models in a tank at the time at Langley. Trying to oscillate around and see what kind of life cycle this device would have after it hit the ocean. And the first thing that

happened was that these great big devices got all tangled up and broke. So I went over to the shop and I designed a swivel joint. It was a half an inch long … three quarters of an inch long. It had steel balls in it. I drilled a hole through to open up two parts [then] screwed them together. And you had a swivel joint with a ball and it displaced these great big turnbuckles.

You wouldn't believe that an engineering department would have put aircraft turnbuckles, that are that big, stowed around the heat shield in those early days. But they just didn't think. So I showed the … I made the change and I showed one of the little small swivel joints I came out with. Guess who I showed them to, Mr. McDonnell. He was out on the field and he was visiting us. We were water tank testing at the time and he knew that we were breaking the big turnbuckles that are getting skewed around. So I took one out and held it in my hand. And he says, "Can I have that." And I said, "Sure." So he took that hand-built little brass turnbuckle [swivel joint]. He took it back to McDonnell Douglas. He said, "Hey guys, here's what you want to use." That was the design change. But that's [typical]… I give you this because this was the kind of thing that we did inside the civil service. You know we're working with projects. And said, "My lord, this is no good." But that aside was related to some of the things that we offer directly to the program. A fix for that heat shield.

They have a water testing tank at Langley and they would jostle this thing back and forth and after twenty four hours or so, maybe less, it would get so tangled up it would tear loose the fabric and the heat shield would fall. If that had happened in the real flight, the astronaut spacecraft would have turned upside down and be open to the sea and we would have lost crews. So it was super critical. It wasn't just a nice thing to have. And [in] the case of the heat shield, after that was demonstrated at Langley, I flew down to the Cape and

actually was in the clean room with John [H.] Glenn [Jr.] who was following the development project. I, more or less, was supposed to be the authority on those new swivel joints on that project. So I'm stuck. I've got pictures of me standing right there with John Glenn whose…he's the Mercury astronaut that was concerned about it. We had a closeness. In other words, I was able to be right there on the scene in that case.

MCDONALD: In reference to the operations?

KINZLER: Okay. In general, we had most people came to Technical Services Division with a project they were interested in and we would support them. I had a group of technicians though that I put together called a Field Test Branch, and it was unique. They were able to interface with the astronauts and "in the field" conditions. Remember, we talked about heat shields that weren't working right and parachutes drops and so on. Well, this group of technicians that I put together would travel around and they would go to White Sands, New Mexico. And they would participate as field technicians who knew how to assemble and disassemble the particular object that was being tested. So I actually had a support group called Field Test Branch. They were available. Or in other words, I had … they were in my employ and I had a right to [send them on] travel and that sort of thing. But they were assigned, more or less, to join the design guys and testing people, and they formed a temporary test team. So I did that too. That's another side. I almost left that out.

MCDONALD: So these people … would they be collocated with the design team?

KINZLER: No, they would actually go in the field. When they went on tests, they would go in the field with them, but they didn't actually collocate at the time of the design part. They just went on travel to help. And one example was the astronauts were learning how to make their final safe descents into the ocean by flying on parasails. We would tow them out, lift them up to elevation with a parasail and then let them descend and land. And we had to have crews on the temporary boats to do that. So my techs would be out there working with astronauts teaching them how to survive their final landings if they were out in the water and so on. So that is one example.

Another, when we were doing the heat shield work out at Langley, we used military helicopters to pick our boiler plates up, fly out over the bay, and then we deployed them by parachute. And our crews would be out on a boat and they would meet them. When they pass when the spacecraft came down and landed, they would motor over to it with a boat and hoist and pick the thing back up. So, actually I provided roving technicians as one of the functions I did. Isn't this wild.

It's mind boggling when you think about it. But we had the opportunity to do what we thought was needed. And I just put together these departments as I saw the need for them. Partly because I roamed around Langley doing this work in the early days on specialized work. But, I think mostly the necessity occurred so I would fill it. For years, the early years, there weren't any technicians working for anybody else except Tech Service Division. You know, when we first came together. Then I released them, [as] the Crew Systems Division was created at the space center. And I had a whole bunch of technicians … well, I hired the ones that actually did the space suit work. They designed the dress [provided technical support as]… the astronauts put their gear on, [etc.]. I had a group that did that in my

department and I released that group over to the Crew Systems Division. So I knew I had that to do. Way late in the game, we abolished the Field Test Branch which was, I think probably because we were beyond the point of needing it anymore. We had too much going on. But in the earliest days, we really had our hand in everything. It's hard to believe but we did.

MCDONALD: As part of that, is you moved from one program to the next. How did you see the nature of your job changing?

KINZLER: Okay, very similar things occurred. Mercury overlapped Gemini, Gemini was a creation of a two man vehicle and it used a lot of the technology that was developed in Mercury obviously but there was some technology that was brought forward for Gemini that had to be abandoned. And we were involved with that. There was a concept of doing a soft landing by having retrorockets on the device coming down that when it sensed that it was six feet or so or eight feet above the earth, it would fire these retrorockets and make a soft landing by rocket descent similar to what we actually did when we went to the moon but we are over in Gemini now. And we had that concept. So my technicians who were involved and we did a lot of drop tests of Gemini type capsules trying to see whether or not if it was feasible and reliable enough or not to use the retrorocket descent concept as opposed to just a larger parachute. That was one thing but there was still another. There was a fellow at Langley who was famous for a type of kite that is a gliding kite. His name was [Francis M.] Rogallo. Mr. Rogallo patented a kite that was very effective. It worked real well. You could control where it was going and all that. So along comes the designer thinking about,

'hey why [not] think about landing the Gemini capsule by means of a deployable kite.' And by a kite I mean it looks just like a kite. I can't think of the word that it is called. The wing was deployable. It was all folded up. So we ran tests. They ran tests out in California at El Centro. And they dropped these models with my crews out there. They dropped the models of this kite concept or wing concept. And the problems they had was they could not deploy it successfully time after time. They'd have one or two work and then one would go awry and wouldn't deploy right. So that particular concept [for the] Gemini program had to die. [I now recall] it was called a parasail.

MCDONALD: It is what they used for hang gliding.

KINZLER: Yes, [to] simplify the matter. That device was going to be used to hang glide the Gemini down instead of parachutes. Let's put it that way. So anyway, that fell out. That program died but it was done in house testing. All that went through first with models and they went with full size stuff. And again my crews, my guys were on the job doing that. But that particular program was set aside based on it was not reliable. So we went back and said Gemini's going to have an escape tower and is going to have parachute landings and so on. We carried the escape tower all the way through. We had it in Mercury, Gemini, Apollo, Skylab. And that was the beginning thing that they decided we must always have that you know for safety o[n] the launch pad. Let's try something else here.

MCDONALD: Would you care to comment on the characteristics of the various leaders you had direct relationships with during the early days at MSC/JSC?

KINZLER: Well, George [M.] Low in my opinion was one of the most outstanding members of the space program. And his abilities were well known to everyone, but he was such a good engineer that he would conduct the meetings that I happened to attend from time to time. And he held a review committee where they would, every week, check the progress of the contractors operations and so on. They would critique things. George was so capable of having a second sense, I guess you could describe it that way, of the right or wrong way to go forward with a particular procedure. He would state his point and he listen to everybody. Who also had alternate suggestions. But he reserved the right to always put his own thoughts forward. They were so darn good that I'd say ninety percent of the time, whatever was being discussed would go in his direction favorably to him.

But he had a strong ability to make people want to work with him. He really attracted key people well. And in my opinion, he was an outstanding engineer based on his knowledge, his perception, and the fact that everybody just loved the guy. I mean he was a nice guy. And sometimes you don't have that as you well know. I think that there are others who are not as well liked. I can't say a whole lot more about George except that one time when I had to give a presentation in headquarters as chairman of a source evaluation board where we were going to award a contract and this was a five million dollar contract for the photo service labs. And I had a headquarters level presentation to the director of the agency. And I flew up there and George Low went up and some others were there. And there was a lawyer working for NASA Headquarters at the time who I think liked to show his authority by his position. Better said. He would critique the presenter and challenge you as to whether you were sure of these presentation facts that you're presenting. You know, it is a

summarization of what the contractor has in the way of staff, and ability and all. Well this particular headquarters lawyer was starting to press me pretty hard. I'm up there standing in front of the group. And the head of the agency sitting back listening. He pressed so hard that George Low who was sitting nearby. He finally said, "I think we've gone to far with this." He said, "You know, we brought Mr. Kinzler up here as our presenter. And he's been six months with a group of people analyzing the details of this contract. And he certainly knows what he is doing up here. I think you ought to lay off the guy." I'm telling you. It was fantastic. He just cut that guy completely off. He says, "You know, you are running on the wrong level here." And I felt like I was on cloud nine.

But he was supportive to me because he knew what my ability was. He knew I spent months with this team of people. And I do not know if you are aware of this but a contract to award … a contract can have a group of people put together like a half a dozen and were put off at Ellington Field in private rooms. No one can see us or anything or hear us. And then we evaluate all the technical aspects of the proposal. And when you're all done, you summarize it and then you prepare to present it to the local JSC receiving, the procurement people. And usually the assistant director sits in on that. And finally you give a presentation like to be to George [Low] and Chris [Christopher C.] Kraft [Jr.]. And you make that presentation. And you do all that before you ever go as far as Washington Headquarters [NASA Headquarters]. So you know darn well that you've pretty well put it together. Well that's Abbey. I'm sorry. I didn't mean to say that. That's George Low.

Bob Gilruth is [of the] same cut. He was a man who was loved by his employees and he had abilities to pull a team together. And he again was a brilliant man, a very [impressive person]… You don't often find a creative thinking person who also has management skills

maybe and people skills. You know handling people. So often they're individualists and it's difficult to find a combination that's ideal. But I think of Gilruth and Low, back to back, they were right in there together, as being two of those type of people. Wherever they went, and did whatever they were to do, would be a team effort. They weren't seeking notoriety or a lot of praise just because of what they do. They were down to earth people … really, very good.

You asked about different ones. Let's see who else. Paul [E.] Purser, I don't know if you're going to go to Paul. Paul was an aid to Bob Gilruth and he came out of the Langley PARD [Pilotless Aircraft Research Division]. And he was a staff oriented guy that did a real good job. I'm sure Bob thought the world of him. And I just know him from my days in making presentations up there at the head office. But Paul, again, was a well thought of engineer. Maybe I should touch on something. The original group of key people were basically design engineers in their own realm. And they took on a job of putting together and managing this program. And they all had an insight into whether a good designs were being presented by people below them or not. And they were in a position to make judgments on what was the right direction to go. And I think that's very important and I don't know if we have as much of that in the present or not because I've been away twenty years.

But, seriously, the original space task group staff consisted mainly of people who were quite knowledgeable in their field of endeavor. I'm talking mostly about their background source. And they would learn how to, maybe, take on management jobs. I was one of those. I didn't know how to manage anything but look at what I wound up doing. I mean to me this [is] unbelievable. I wound up recruiting two hundred employees. I came out of [a] program of apprenticeships. I don't have a degree. I went through University of Virginia courses in part of my apprenticeship program but it didn't encompass enough credits

for a degree. But the thing is, I spent my first twenty years working side by side by professional people who all came in and out of the shops and there's no way you can learn better than have it rub off on you. And so we had opportunities to make suggestions. And my dad was an inventor before me. And by the way, I have four NASA patents and I'm very proud of that. But I primarily think about our early group of people [who] were talented people. They were selectively chosen and they had the ability to make things happen.

[End of Interview]