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Biographical - [date/place of birth; family background] _____

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INTERVIEW WITH JOHN KIKER
June 24, 1968

I was originally in the Research Section of the Parachute Branch at Wright Field. Kirby Hinson who was originally from my home town was working with me while a student at North Carolina State. After graduation he joined the Space Task Group at Langley Field. About this time I transfered to the Army Aviation group at Fort Eustis, which was known as TRECOM, Transportation Research Engineering Command. I became involved, more or less as a side line issue in some ejection seat work for the Army for some of their VTOL and helicopter type aircraft. Like all organizations that are just getting started, STG didn't have anyone with any experience in recovery systems except Kirby. He came over to TRECOM since it was only about 15 miles from Langley to borrow reports and drawings on chutes that he had worked on at Wright Field. After several months, I decided I could progress more rapidly in a new and interesting program and transferred to the Space Task Group.

The Mercury Program was pretty well along insofar as the qualification of the recovery system was concerned, so we began working on Apollo as well as finishing up the work on Mercury. We looked at all types of systems and the contractor studies that were going on at the time. Kirby and I evaluated them, and wrote the specifications for what we thought was required for a landing system for an Apollo type vehicle.

After the first of the year it was announced that we were coming to Texas. The first definite word I had was from a radio news announcement. There was naturally a great deal of interest in coming to Texas and in building of a new center. "Carla" had ravaged the area shortly

before, and several of our people were delegated to come down and look over the area to see what facilities were available. I had been stationed in Texas several years during my military service, so I was pretty familiar with the Texas first hand. My first trip to Houston was in connection with a meeting held at the Houston Petroleum Center. We didn't have much furniture--just a few chairs, but we decided we would hold a meeting to get started in this area. I did move to Houston in February 1962 but my family stayed in Virginia until our house was sold, and school was out, which was after the first of June.

In our work on the landing systems for Apollo naturally we were following the same type of technology that we had for Mercury and Gemini, which was paralleling Apollo, was also based on the same work. Most of the qualifications of the parachute system was done at El Centro. El Centro had been developed as a joint parachute test facility in 1951-1952. The Air Force and the Navy combined their programs, in a Navy facility set up an organization known as the 6511 Joint Parachute Test Group. Both the Navy and Air Force sent people out there primarily to do parachute testing. It is a good site in that there is a very large expense of desert area available, and the weather is generally good the year round, although it gets hot as the devil in the summer. Up to this time there had been minor testing of the Mercury equipment from very low altitudes at Wallops Island and some testing of parachutes had been conducted in what was called the back bay behind Langley. We had even made one or two tests on the field at Langley. We decided after we got down here that if we could we would like to find a local area where we could conduct our tests. We were then in the process of trying to develop a land landing

system for Apollo. Unlike Mercury, very early it was decided that Apollo was to have land landing as a primary mode and water landing as a secondary mode. We had been working on a gliding controlable parachute which we had modified and built there at Langley. It used a retro rocket. We adapted some rockets that were spares from other test programs and we were utilizing them to slow the descent of the vehicle during the last five to six feet. So we had made a couple of static drops from cranes with rocket systems while still in Virginia, and we had made a drop with the parachute system. We brought all that system along with us to Texas and were using a modified boilerplate Mercury in the test.

We initially asked EAFB if it could furnish aircraft support, and if we could use Ellington. But EAFB didn't want us to drop test on the field at any altitude, so we decided we would use Galveston Bay. We leased a shrimp boat for retrieval. EAFB provided us with a C119 aircraft and we decided we would make a drop test as soon as possible, just to get people back in the swing of working. That first test was probably the most spectacular we've made since we've been in Houston. The local TV station got wind of this test and they wanted to observe it. We didn't want them around because we were a little bit leary about what might happen. We rigged up a vehicle and we made a drop in the Bay. The local TV people rented a private airplane and they were flying chase with out test aircraft. Wouldn't you know--as our vehicle came out of the airplane it broke a static line and "free fell" all the way to the bay. Our first big splash was really a big splash in that we had about 3000 feet of "free fall" with 2,500 pounds of Mercury vehicle, and lost it in the bay. That is the only serious major malfunction we have had. About a week

later we tried again (and we had TV coverage again), and this time we made a successful drop. That was our beginning in the Houston area. It took an awful lot of scrambling to get equipment, and to get the Air Force to help us. Elements of the Center were scattered over southeast end of Houston. We didn't have proper facilities initially, and we had an awful lot of headaches and hard work trying to get around such problems. We packed chutes on make-shift tables down in a hangar that we had taken over at EAFT, but our tests were very successful. Shortly after we came, the oilman, Mecham, offered us a little spot of land near Hitchcock as a testing site, but there were too many oil wells and other hazards around it that we were afraid to use it. Instead we obtained the use of an area near San Marcus which had formerly been a Army training base. We made our first successful retro-rocket test on land there on a drop at San Marcus. The air crew would fly to the drop zone in the morning of the test and the ground crews would drive over earlier.

All the time this was going on we were still testing at El Centro. The Gemini program had intended to use the paraglider initially, as its land landing system. It was to use a tricycle type skid landing gear. I was not involved directly in the Gemini program initially, as the program office had its own recovery group and it hired people to handle the ejection seats and the paraglider effort. Indirectly, however, we did participate; we did attend a lot of their meetings. This was Mr. Chamberlin's way of running that particular organization in the beginning. Ken Heck was his principal ejection seat man, and there were several people that had been hired from ADIC. The Apollo program of course was handled differently and we were directly and actively involved in the engineering

and development of the system. Since Apollo then still contemplated a land landing as the primary recovery mode and a water landing as backup, we knew we had to develop an attenuation system as well as compensate for the approximately 30 feet a second rate of descent that one gets with a parachute. Apollo was quite heavy, and we knew we would need a cluster type parachute arrangement. In our initial calculations we determined that we needed three chutes to do the job; two would be satisfactory and one would be a backup. We anticipated the landing weight would be around 8200 pounds, or rather that is what North American anticipated. From Mercury experience we knew it would probably be more likely around 10,000 pounds ultimately, so we asked Caldwell Johnson to send North American a directive telling them to develop a landing system with a capability of 10,000 pounds. Caldwell thought that was too much and trimmed it to 9500 pounds. For a long time 9500 pounds was used as a control weight. NAA subcontracted the chute development to Northrop Ventura. Northrop Ventura had developed a very successful ring sail type parachute for Mercury and now began developing a cluster of parachutes for Apollo.

Since we had no test facility of our own we used the El Centro range. It had tracking and instrumentation capability, and it would have been wasteful to have duplicated that type of drop test facility in this area. Although we made some preliminary low altitude drops of some of the parachutes and some of the related hardware here, all of the qualification and testing of the vehicles, and boilerplates have been conducted at El Centro. About the time that paraglider began to have development problems we began to develop a system known as "Parasail Landing Rocket System." It was developed entirely in-house with help on the parachutes from Pioneer

Parachute Company. We built a vehicle, installed a Gemini pack landing gear and put these controllable parasail parachutes on it. It was a refinement of the chute that a Frenchman (Lemoine) had developed and Pioneer had bought the licensing rights to. A person could put on a harness attached to a small chute and a car could tow him up to the altitude and back down. We took that parachute and made it into a gliding parachute. We found a good area to test it at Ft. Hood. We made our successful land landing test of this parasail landing and rocket system--a drop test with all the trimmings and landing very, very close to our mark after controlling it all the way down, firing the landing rockets and sliding out on the landing gear. (I can give you a good reference document with all the dates).

We developed the parasail because the paraglider itself was so far behind schedule, but we could not develop the parasail system in time to make anything but perhaps the last two flights and, so it was decided to use a conventional Mercury type ringsail parachute on the flight. The Gemini Program Office developed this conventional type landing system with the drogue and main ringsail canopy and Northrop-Ventura built it. There was a lot of controversy over whether the guidance system was adequate to give us the accuracy we needed to land on a land area, and although we were offered many areas in Texas, Florida, and elsewhere in the U.S., the decision was finally made at the very last minute that it would not be used. It was not fully qualified, but we had made enough tests including the rocket to feel confident in it.

We initially planned to use a dropable heat shield for attenuation besides the individual crew couch strut. We set up a crane to make some

drop tests with. We made a pendalum swing rig in which we could test scale models and we put it in the hangar at EAFB. However, there was still a little uneasiness over the initial false indication that Glenn had that his heatshield might be extended just before his reentry or during his reentry. They didn't want to use a dropable heatshield on Apollo. About this time, after we had made quite a few tests with models, we were directed to change the primary landing mode on Apollo to water landing, with land landing as emergency capability. When that was decided a considerable amount of work was put into increasing crew couch safety and honeycomb was put around the nose of the vehicle.

When the paraglider effort was canceled, our people were anxious to get the surplus McDonnell facility so that they could modify it and use it for testing here. We did get it, had it redesigned and modified, and it is now one of our major test facilities. Prior to getting that facility we made a couple of crane drops on land with an Apollo type vehicle up at EAFB, and we did use retro rockets. We developed a retro rocket type capability for Apollo, and tested it on a couple of land impacts. It showed that it was potentially a sound concept. We came down here to the back 40 area and dug a big hole; as I remember it cost about $1500. We lined it with plastic and filled it with water and made some crane drops into the water with the Apollo-type vehicle. I remember Joe Piland and Aleck Bond told me, "Now John, we got that hole back there for you, but don't come asking us to line it with concrete or to put up a nice facility." Well over a period of time we have gotten that nice facility. It's very fortunate that we have, because the Apollo weight has grown from that initial 9500 pounds to now 13,000 pounds. It is partially lined with

concrete, we have the rig modified so that we can test in one direction for land and we can test in the other direction in water. It has the most capability of any that we know of in the Free World for land and water testing. Utilizing that facility to qualify the Apollo vehicle for water and land landing capability was especially important because the North American rig was not developed to handle 13,000 pounds. We also have a portable swing rig which we have taken to the Cape and made a lot of drop tests with the Apollo boilerplate vehicles capability we have for a land recovery if we should have an abort. All of our aerial drop tests of the Apollo boilerplate vehicles have been conducted at El Centro. There are several reasons for that. In the first place, there is only one airplane that will take payload the size of the Apollo vehicle to the altitude required for the tests. It is a specially modified C133, which we have used from the very beginning of the program. Our drops have been made from as high as 32,000'. Secondly, El Centro has another advantage. It has a water test area at nearby Salton Sea. The Salton Sea is about 40 miles away and was also used for the Mercury water testing and I believe Gemini as well. El Centro has always had an excellent range and instrumentation capability, and it has just increased capability its tracking and TM capability.

We are still developing gliding parachutes and we are allowed to use EAFB to make small scale tests--up to 400 pounds.

Here in Building 13 we put in a tank to test scale model spacecraft. We use a pendalum rig. We also have ability to do comparable testing for land landing here in building 13 and it also has been useful. We have made a lot of model tests and they have given us a good indication that

our full scale test conditions will be satisfactory.

We are continuing to work on parawing, sailwing, parasail and cloverleaf gliding parachutes. Sometime in the future we'll have a land landing system for Apollo or other advanced spacecraft.

On Apollo we planned for a parachute system with about 27 cubic feet of volume in case we didn't have a gliding parachute or a parawing sufficiently developed that it could be used in the landing system. As design changes were added, the volume kept getting smaller and smaller, but the weight kept growing and growing. Now we have less than 15 cubic feet of chute volume on Apollo and the weight has increased from 8200 pounds to 13,000 pounds. The parachute system is being pressure packed to the density of maple. We use a 50 ton press in the packing procedure. We also have gone from single stage reefing on the main chute to two stage reefing and we have just a couple of test remaining to qualify this upgraded system for the present Apollo command module on our weight of 13,000 pounds.

We have had some problems with North American people working on the Apollo Landing system. The company has a number of competent people, such as Charlie Lowry, who has been in the parachute business for a number of years. I had known him when he was with Irving (?) and the University of Kentucky and then he went to the Columbus Division of NAA and there worked on the ejection seats. When the Apollo contract was negotiated we were told that if there were any people in the North American organization that we knew who had experience in comparable areas, they could be requested for transfer to the Downey area. Lowry was the first one that we got put on the job, and has been with this aspect of the program since then. Another was Bob Rodier, who had experience with the Army

Group at Nadic, Massachusetts. He had applied for a job with me, at the time I didn't have a billet so I gave his name to Charlie Lowry and Charlie hired him. He has been on the job the full time. Phil Young, who had worked with SRS in the parachute area, had done some work on automatic opening devices and had also been with the Navy, has been with this group. So NAA has had a number of competent people on this aspect of the program from the very beginning, and it would be easy to assume we should have had no problems. This has not been the case, and we have much difficulty with them and NAA over costing and scheduling. Every time we needed something done, the NAA people would agree but would name an unreasonably high $ figure and maintain it would result in slipping the program two to three weeks to four weeks. Because of this, in many cases good engineering got compromised and the engineers at North American would know it. Lowry's supervisor is a fellow by the name of Don Necker. Necker's primary experience was on the X-15 program. He is capable but really didn't have any parachute experience. It seems we encounter a lot of hardheadness, headaches and problems over technical arguments and they always seem to wind up impacting cost and schedules. What has probably bothered me even more is what seems to be inadequate quality control by them and their subcontractors. I don't know whether this is because the program is so large and complex, and maybe there is too much paper work, but it's a constant problem to keep up with the drawing changes and the manufacturing errors. We get an item in the field for testing and it will be wrong. Recently we were ready to make a boilerplate test and the flower pot, which is made out of titanium and is where all the three main chutes and the two drogue chutes are attached, had a serious manufacturing error. Our people in the

field found it. They could not install it and it took almost two days of calls to North American to get them to send it back to the plant to rework it. After it was finally supposedly corrected, it was sent back for testing and it was still wrong. We had to take it off and send it back up to the plant again and get them to correct this one error before we could use it. True, it was a minor thing but it cost us two days' time, and should not have happened. Also it seems to me that they never really investigate problems to the degree that they should. They seem to do things without giving adequate thought to what may be the consequence, and as a result, we have to check them and point out these obvious problems. In short, the Manned Spacecraft Center has had to do a lot of the engineering for North American. In recent months we have had to put a man from MSC in the Northrop Ventura plant full time, and another man down at El Centro in our field office operations. This step has been necessary because Northrop Ventura, somewhat like North American, has not been giving proper attention to quality control. Northrup Ventura started out in the recovery area on a very small scale making recovery chutes for drones. Then the Air Force gave the company a number of contracts and they got in to the recovery systems area. They built a parachute manufacturing plant in El Paso. About two years after we started the Apollo program, they closed the El Paso facility and moved the operation out to Canejo, California and consolidated their manufacturing there. The Northrop-Ventura parachutes used on Mercury, Gemini and Apollo have been very good and very reliable. N-V have worked out techniques where they can hold very close tolerances on most of the manufacturing work which is essential. They can do beautiful work, but also will turn around and get very sloppy and

let a lot of things get through that shouldn't. I guess some of the poor quality control comes from a lack of incentive. This varies. As we put pressure on them, they will correct mistakes; but nevertheless we have had lots of malfunctions that were caused by pure stupid mistakes. A good example of this is the connector links. To keep them from slapping together we had a padding or packing put around them. One of their people, on their own made up a plastic cover to put over the links without our knowledge, installed it, and it contributed to a test failure. Just recently we could have had a failure in a deployment bag. They put in a basting stitch to hold a piece of equipment in place until they could sew it (which is normal procedure), but then they never sewed it. It went down to the field that way, was packed, and was used on a test. It was discovered after the test. The retension loops that help hold these packs together have been sewn on backwards. Now all of these problems have occurred within the last couple of weeks and by this time it ought to be a cut and dried operation. None of these items was a serious problem, but for the price we paid and the amount of QC coverage we've had, they should not have occurred at all. These two items were found in the field. DECAF inspectors (Air Force inspectors) had signed off that they were OK and the North American inspector had signed that they were OK, and the Northrop-Ventura inspector had signed that they were OK, but when they got to the field and they were found to be wrong. It seems like we've had a constant problem like this with Northrop-Ventura. They have a lot of capability in their people and they can do a very good job if they want to, but we have to continually watch them.

North American has Northrop-Ventura on an incentive type contract and

here is a good example of the problems that always seem to crop up. We need good instrumentation on our main and our drogue chutes and we are constantly told by N-V and NAA that to do a certain piece of instrumentation would take so many months because it's so difficult to do. We put the pressure on them, and in about 10 days' time they had very find links made up for the main chutes and its given very good data. But they didn't do anything about the drogue links. We are ready to make another test on the drogue chutes this week. There are so many implemented clevis that they have given erroneous readings, and we knew they are incorrect, that we have asked them to put in a link with accurate instrumentation in the system so that we could get a delta error identification, correct our data, and thereby have a little more confidence in the data that we have. They haven't done anything and so now we are ready to go again, but are going to have to go with one instrumentation link. We won't have this instrumented clevis, despite the fact that they have had weeks to get it ready. Now they tell us that if we want them to they can change it, but it will slip the test a week or 10 days and it will cost us money; and furthermore they tell us they think we really don't need it. It seems to always get back to the problem of schedule and cost.

Northrop-Ventura has had many managers on the program over the last five or six years it has had the contract. A fellow by the name of Bob Wondka is the manager now. A fellow by the name of Wes Steyer is the Program Manager. I guess over all they have done what is probably a very satisfactory job, but we paid a gold-plated price for it.

Again, although they have done well overall, it is unbelievable how some of the things get by in the engineering area that should have been

detected. As an example, we established a standing rule many months ago that on the qual program we would use all new hardware. There would be no used equipment. Our own man at El Centro discovered that used hardware parts were going into finished assemblies. The difference between used hardware and new hardware is really very little in terms of the cost, because inspection, repair, cleaning and checking are required. We are now ready to go on the two remaining tests and the back up chutes--the drogue chute in one case and some equipment on the other--are used hardware. It is most frustrating--I'm sure it will be satisfactory and they have inspected it and say it will be good as new, but it simply doesn't meet specifications, and we can't see why we have to continue to operate this way.

I think it would be worth mentioning, some of the characteristics of the El Centro operations. Northrop has the responsibility for getting the vehicles ready for testing and the Air Force project engineer conducts the test on this joint range. He provides the scheduling, the test data, writes up the test results for us. The Navy, thru the Air Force, provides the photo coverage--both air to air and ground to air photo coverage. Northrop-Ventura occasionally provides the on-board cameras, and in some cases have also provided cameraman, particularly if there is a certain type coverage we want that the Air Force is unable to provide readily. Frequently there are as many as 30-50 people in the field. We have NASA QC coverage down there, we have Northrop-Ventura and North American coverage and field test engineers. This fairly large number of people from different outfits occasionally has posed difficulties. At one time we had a rash of problems, like squabbling among themselves, failing to provide straight-forward answers to direct questions, covering up defi-

ciencies or failing to reveal problems unless asked specifically. During the last few months this problem has been greatly alleviated, with the assignment of an MSC employee, Lee Normal, to El Centro. Although he has not been given any overall authority, he is an ex-paratrooper, and has had a lot of parachute experience with General Dynamics. He is one of those guys that just does not take static from anhone. More or less by force of personality he has assumed control. He has welded together a conscientious and cooperative working group like we have not had on the program before. We have been able to make a qual test every week, and he has been able to accomplish things that we have not been able to accomplish before. The fellows will tell him what is wrong and it gets fixed. Its the best working relationship that we have ever had.

In another area of our work we have a contract with Douglas to maintain and fly a C-133 aircraft for NASA. The Apollo vehicle is snuggled up in the cargo-loading area to an "A" frame and we drop it out the bottom of the airplane. It is unlike any of the other tests that we normally do, as in the case of the C-130 or the C-141 or the C-119. The spacecraft is extracted out the back. These other planes were not big enough--Apollo was too wide--so we had to modify a 133 to accommodate it. It is on the loan from the Air Force to NASA and we hope to finish out the program with it. We have also made a lot of development tests utilizing C-130, B66, and B52 aircraft. Now the Air Force arranges for the loan of the other airplanes to us.

The Air Force group at El Centro comes under the jourisdiction of Edwards AFB. Philco has been running the range for the Air Force which is an indication of the number of different groups that are involved.

Thus we have people representing Philco, the Air Force, the Navy, North American, Northrop-Ventura, and of course MSC.

The Gemini program used ejection seats and there was a question as to how we could adequately train the astronauts in parachute employment and survival so that if they ejected over land or water how they should use their parachute. This was the parasail, and we got a couple of them from Pioneer very early in the program. We didn't have any place to try them out so we talked to Cliff Hyde who runs the Cliff Hyde Flying Service in LaPorte. He agreed to let us use one of his runways to try towing one of those chutes. We had never tried towing one and it was stated by Pioneer that they would not drop. It showed such an L/D promise from the pcitures that we had seen in towing that we decided we would try it anyway. So we took an old GI gasoline can and filled it with dirt and made a harness for it. We rigged up a pickup truck that we got from Tech Services with a release on the back and we went out to Cliff Hyde's. Lee Norman and I each picked up one side of the can. We had two fellows who had to hold the canopy out in a inflated position. We instructed the driver of the truck to start and we would run along until he got up speed and then we would turn it loose. Well the very first try I got to running one way and Lee got to going the other and I turned loose my side of the can and it dropped on Lee's toe and broke it. We did get it to tow, but we were afraid to tell anybody how Lee's toe got broken so Lee said he jumped off the back of the truck and broke it. Later we got very proficient and got permission to let Lee ride the parasail. We got to the point where we could tow Lee up quite well and get him down. It ended up that we came out with a system that Lee took a personal interest in this thing and

worked up a training program for the astronauts. This was later conducted down at EAFB, and we used tow rope lengths from 300 to 1500 feet so we could tow the astronauts up quite high and release them and give them very good training in how to make turns and how to make parachute landing falls. From that we progressed to the water with a boat where they put on survival gear and their suits and so we gave them splash down parachute training. The Air Force heard about it and got interested, and after we had several requests from the Training Commands, Lee ended up training Air Force crews. Now it is a universal Air Force training requirement. Every month we get reports where pilots have indicated that this parasail training has been a contributing factor in saving their lives. Although the Gemini crews didn't have to use their personnel chutes, it certainly was good training aid and proved to have other spin-off applications. We have received a number of letters from Generals and very high people in the Air Force thanking us for our effort and support and so if nothing else, that has been a very worthwhile side line benefit of the program.

We also started the Air Force on a program to develop a gliding parachute for aero delivery. The Air Force wanted a way of delivering cargo under night time and bad weather conditions and also to provide an offset type delivery, where the drop could be made at a point several miles away from the target, and the payload would then glide to the point so it wouldn't fall into the hands of the enemy. This was to be done with a ground radio command signal and an onboard receiver. We made several demonstration flights here. The Air Force sent in Sandia Corporation, who had done some radio control work for them and Sandia put their radio control homing system in our vehicle. This development work is still in

progress, and represents a second side line benefit from the Air Force standpoint. Several groups here at MSC have participated in this program from the very beginning--Tech Services, IESD, Photo Services, Aerodynamics Group and Landing and Recovery Division.

* El Centro was used for extensive Tests of parachutes. Paraglider Tests ~~used~~ done at Edwards. Parasail Tested at both Houston + El Centro (Houston used for deployment + system checkout) for actual performance data went to El Centro where an instrumented range was avail.

Some small radio - control drops were made at EAFB at the end of main runway at low altitude - from early 1963 on to present.

Landing & Recovery Div. obtained the drop A/C from AF and other operational support

Kiker only supported Gemini Test program at El Centro seen by Ken Necht.

Kinzler and IESD (instrm) supported in packing parachutes requiring pyrotechnics & instrumentation; also Photo lab furnished photo coverage

(MCD + Ventura)

Contractor & subcontractor furnished all support at El Centro not furnished by Range. Gun & lip MSC furnished each monitor

GTI group provided Range control, A/C, and photo coverage plus chase A/C, retrieval vehicles, plus area for packing & assy