NASA HEADQUARTERS NACA ORAL HISTORY PROJECT
EDITED ORAL HISTORY TRANSCRIPT

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INTERVIEWED BY REBECCA WRIGHT
HAMPTON, VIRGINIA – APRIL 3, 2014

WRIGHT: Today is April 3rd, 2014. This oral history session is being conducted with Wilmer Reed at NASA's Langley Research Center in Hampton, Virginia as part of the NACA [National Advisory Committee for Aeronautics] Oral History Project sponsored by the NASA Headquarters History Office. Interviewer is Rebecca Wright, assisted by Sandra Johnson. Thanks for coming out and meeting with us today; we appreciate you coming into the Center. If you would please start by telling us how you became involved with NACA.

REED: I've been interested in aviation all my life, starting at the age of nine when my aunt gave me a model airplane and helped me build it. Since then I've been interested in model airplanes, flying and building them, even till today. I graduated from Sidney Lanier High School in Montgomery, Alabama, in 1943, enlisted in the Navy in the Naval Aviation Training Program, and through that training I was commissioned a naval aviator at the end of WWII. I wanted to go back to college, and I went to Auburn [University, Alabama], got my degree in aeronautical engineering in 1948.

Some of my classmates had previously been hired at NACA [Langley Aeronautical Laboratory], and I guess that's the first I learned of it, and I was so interested that I arranged to go there. In fact a recruiter came to Auburn named Walter Hixon. He was in the Education Department at NACA Langley. It just happened he was an Auburn graduate also. He must have been mighty convincing because almost all of the small aeronautical class was recruited by Walter and we all came here at the same time.

I was assigned to the Flight Research Division [FRD] headed by Mel [Melvin N.] Gough, a former test pilot. At NACA one of the first I met was a test pilot whom I had known as a classmate at Pensacola [Florida] in the Navy. His name was Bob [Robert A.] Champine. He was a model builder and so was I, so we just connected right away, and it was a surprise to me that Bob was there, because I'd known him just two years before in the Navy.

Bob was older than I, and he had graduated from the University of Minnesota before going into the Navy. Upon graduation and getting our wings in the Navy we had a choice to make: you could elect to either go into carrier qualifications or into the inactive reserve. I elected the later course, because I wanted to get back in school. Bob elected to go into carrier qualifications, and that was the last we'd seen each other until I came to Langley and met him as an NACA test pilot. In several of my projects Bob was the pilot. That was interesting, and we've been friends for a long time.

One of my first projects was developing an idea conceived by my boss J.W. Wetmore. My assignment was to evaluate analytically the effects of a curved ramp on the takeoff performance of catapult-launched airplanes. That is, to help get the airplane pitched to the right angle of attack and flying before dropping into the ocean. I used that as the topic of my master's degree thesis, and that was in 1952. In 1970 the British announced that the curved ramp, or so called ski jump technique, was being used on their aircraft carrier. We were pleased that maybe that NACA research had had some influence on their choice. I think the Russians also have a ski jump on their carrier.

[I stayed with the Flight Research Division until 1960, so there was a 10-year period there in which I worked for NACA before it became NASA in 1958. During that period wind tunnels for testing models at transonic speeds didn't exist. So, an alternative method for testing models in that speed range was developed at FRD. The technique involved mounting a small model on the upper surface on the P-51 wing where, during a dive, there is a region of nearly uniform transonic flow. Interestingly, to maintain a constant dive angle, the pilot simply viewed a sun dial mounted ahead on the engine cowl and tried to keep the shadow of a small vertical rod centered within a circle outlined below it.

I became involved in another flight project relating to transonic aerodynamics and flutter. The purpose here was to measure the oscillating pressures on the wing of an F-86D that was being shaken at its natural wing vibration frequencies. The shaker force was generated by a hydraulically driven oscillating mass mounted in each wing tip. Unfortunately, this project had to be terminated after the first few flights because of a decision by NACA Headquarters that high speed research flight testing would be done at the NASA Dryden Research Center [now Armstrong Flight Research Center, Edwards, California.] My project's assigned test pilot was Donald L. Mallick who later also transferred to Dryden and flew the YF-12 Blackbird and XB-70 and other research aircraft.

About the time NACA became NASA a group of aeronautical engineers in FRD set out to get up to speed quickly on how to meet the challenges of space flight. Among this group was Christopher C. Kraft and Charles W. Mathews. They and others organized a crash learning program for a group in which each member learned as much as possible about a specific space flight topic. One would become an "expert" on, say, orbital mechanics, another on space rendezvous, someone else on rocket propulsion, and so on. Then the knowledge of each individual would be presented to the group in a series of lectures. Most of these same people went on to become key players in the Nation's manned space program. Chris Kraft, for example, was NASA's first Flight Mission Control Director and later Director of Johnson Space Center in Houston, Texas.

During this same time period, in the late 1950s, a new Langley wind tunnel was about to come into operation. Named the Transonic Dynamics Tunnel [TDT], it was designed specifically for research and development testing in the field of flutter and aeroelasticity, especially in the transonic speed range. Because I'd worked in this area in FRD, I was invited to join the newly formed TDT Aeroelasticity Branch, headed by Robert W. "Boz" Bozwinkle. Boz and I were longtime friends and had gone together to the University of Virginia for summer graduate degree studies. In fact, while we were away at school, his wife and mine shared an apartment.

(As an aside, we were both bicycle riders and I rode my bike to work most of the time. In the summer of 1976, as a part of the Bicentennial celebration, a bicycle-riding activity, called the "Bike Centennial," was formed in which bikers rode cross country from Astoria, Oregon, to Williamsburg, Virginia. Boz participated and pedaled all the way; so did I but for a shorter distance: from Astoria, Wyoming to Pueblo, Colorado.)

Although the TDT was designed primarily for flutter and aeroelastic studies in the transonic range, the first test of a complete model was of a subsonic airplane, the Lockheed Electra. This newly developed turboprop commercial transport fell from the sky for unknown reasons on two occasions with the loss of all aboard. There was urgent need by Lockheed and the flying public to find the cause and to fix the problem. The suspected cause was eventually narrowed down to a heretofore little known phenomenon called propeller whirl flutter, which involves gyroscope coupling between a rotating propeller and the flexibly mounted engine. Lockheed came to the TDT with an existing aeroelastically scaled Electra model which had been modified to simulate engine mount-structure failures. Because of the importance of understanding and designing to avoid this "new" kind of flutter, engineers from Boeing and Grumman came to participate with Lockheed in this around-the-clock test program. [In fact, cots had to be set up for use between shifts.]

In the meantime I'd gotten interested in how one might analyze the problem mathematically. So while the tests were underway a colleague, Dr. Sam [Samuel R.] Bland, and I developed mathematical models to compare with the test data. Eventually, the probable cause of the Electra crashes was attributed to structural failure of the engine mount resulting in a loss in stiffness which in turn triggered whirl flutter followed by destruction of the wing and airplane. As a result, the FAA [Federal Aviation Administration] now has specific requirements that must be satisfied to help assure avoidance of propeller whirl flutter.

[In the years following the Electra tests, flutter models of virtually every high speed commercial transport and military aircraft, as well as the Space Shuttle Orbiter, were tested in the TDT to help assure safety from flutter within their flight operating envelops.]

WRIGHT: I'd like to ask a couple more questions about the process, and how long it took to determine the flutter issue. Was that over months or was it weeks or how long did it take for you to begin to identify a way to contain that?

REED: Every case was different of course. Typically it would take maybe one month occupancy time for the first round of testing of new airplane. But then it would come back for further testing, a few weeks at a time, during the year.

WRIGHT: Was the tunnel continually used? Was something always ready to go in?

REED: Usually at that time it was on double shift operation, yes.

WRIGHT: Were you in charge of all the people that were doing the testing of those?

REED: I was there from 1960 until I retired in 1982. In that time I was promoted to become head of the Aeroelasticity Branch, the position I held until becoming Chief Scientist of the Loads and Aeroelasticity Division in 1980. At the time I left the Branch there were about 30 people including the technicians. All these people were really top-notch. I just can't tell you what a great bunch of people they were and how smart they were. Many times we would have postdoc [post-doctoral] fellows come in and spend a year working in the Tunnel. They would come from countries like Japan and India and Israel. We had an MIT [Massachusetts Institute of Technology, Cambridge, Massachusetts] postdoc fellow and he eventually after that became a NASA employee and assumed management positions at Langley, at Kennedy, became Director of Glenn Research Center, and is now Associate Director of NASA. His name is Dr. Woodrow Whitlow. You probably know him.

WRIGHT: Yes, I have met him. That's nice. That's interesting.

REED: He came out of our pocket at the Transonic Dynamics Tunnel and has gone up like a rocket himself. Very good man.

WRIGHT: Yes. Could you share with us about the team that was at that tunnel? I know you mentioned there were technicians. Of course you were there. The different roles that the different groups, and how they worked together to get these results.

REED: At the time the Aeroelasticity Branch consisted of three engineering sections and two technician sections. The engineering sections oversaw flutter testing, aeroelastic analysis and rotorcraft dynamics respectively; the technician sections handled tunnel operations and test support.

WRIGHT: As these projects came in were they assigned by the branch head to work with certain teams?

REED: Team assignments were based on the skills needed to best support the project in question. For example, in flutter model testing, to help show that the full scale aircraft will be flutter free over its operating envelope, the test engineer must know the signs of an approaching flutter condition so as to avoid destruction of the model. Likewise, the tunnel operator technician must be alert to the call for rapid cut back of tunnel speed. Assignments for tests relating to helicopters would naturally come from the rotorcraft dynamics section. Assignment to do in-house research and/or other outside projects could come from anywhere within the branch.

WRIGHT: Were there very many rejections when there was a request for the tunnel by outside people? If you had to make a decision on who got to use the wind tunnel for a test, were there times that you rejected people who wanted to use the Tunnel?

REED: Yes, if they came in with a proposed test that we felt was low priority or not needed. At that time the schedule was always packed and there were people in line, maybe a year delay before they could get their entrance.

WRIGHT: Because this Tunnel was very unique.

REED: It was a unique tunnel; it had features that are still unique. First it had a different gas. It could be tested in air or a heavy gas called Freon-12. This heavy gas was used because it eased the difficulty of designing flutter models. Flutter models must be designed to have the proper flexibility and weight, and this becomes very difficult if those scaling factors have to be matched in air. It's much easier if you have a heavy gas.

Also the speed of sound in Freon is lower than it is in air, so the power required is much less. There are a number of reasons for that. Also the pressure of the Tunnel can be varied so that you can test at simulated altitudes.

WRIGHT: That's interesting. When you were describing the test, when you talked about the models, were there specific criteria for what you would take as a model? Or did the manufacturer provide the model that they wanted tested?

REED: Usually the manufacturer would provide the model, however, it would have to satisfy all criteria required for the test. But in many cases we would do research on models that were built in house.

WRIGHT: Did you get a chance to design some of those models since you had that expertise of being a model builder?

REED: No, that didn't flow over into TDT. I did, however, build some models at home that I ran in Langley low speed tunnels, mostly for demonstration purposes: propeller whirl flutter, flutter-model mount system, hanging chain damper, stop sign flutter.

WRIGHT: When you first shared with us you talked about Bob Champine. Did you get to work with him much more after you went to work with the tunnel?

REED: No, not after that, except we attended model airplane meetings and contests together, which he usually won.

WRIGHT: He was a good rival. Did you have any interest in going with Chris Kraft and Chuck Mathews to Houston?

REED: Not really, because at TDT I could work on both aeronautic and space related projects. TDT support of the Saturn-Apollo mission is a good example. Here we tested scale models of the Saturn-V erected on the launch pad to study the effects of ground wind loads. From these tests we discovered that at a scaled wind speed of 55 knots, the Saturn would oscillate at levels that exceeded its structural design loads of the full scale vehicle. These Saturn model studies revealed not only a potential problem but also a solution for it, namely, to add dampers to suppress the vibrations. Such dampers, in the form of shock absorbers, like those on your car only larger, were then installed as a connecting links between the vehicle to the launch tower.

WRIGHT: That was determined because of the work that was done here.

REED: Yes, it was the fruit of work done at TDT.

WRIGHT: That's something to be very proud of, because that was very needed, wasn't it?

REED: A similar wind-loads problem was encountered on a Navy antenna system consisting of an array of 24-foot tall vertically standing tube-like structures. At certain wind speeds the antenna would vibrate causing fatigue cracks in the structure. We found in the wind tunnel tests of a full-size antenna that a cluster of rubber covered chains hung inside of the antenna tip would dampen out the vibration. The so called Hanging-Chain Impact Damper was patented and has been used commercially in similar structures including lamp poles on highways and a sports stadium..

During launch of the first Saturn-V at Kennedy Space Center [Florida] windows in the Launch Control Room appeared to rattle and vibrate due to the extreme noise generated by the Saturn rockets. Stories were coming out that the vibration deflections were as much as four inches. There was a lot of concern because the 20-foot-high wall of windows sloped inward over the heads of people seated underneath. The folks at Kennedy sought Langley's help in finding a fix, so, it was decided to take a look at using chain dampers. A prototype damper, consisting of a 20-foot long tube with a rubber-coated chain inside, was quickly assembled, calibrated and shipped to Kennedy in time for installation on one of the window trusses before the next launch. I was in the control room during the launch, and we found from the instrumented window recordings that the levels of window vibration, with or without the damper attached, were indeed benign. What appeared to be dangerous vibrations of the glass were, in fact, just reflections due to minor motions.

WRIGHT: It's an interesting problem to solve, wasn't it?

REED: Turned out to be a non-problem.

WRIGHT: Were you there for a launch?

REED: Oh yes.

WRIGHT: You got a launch, that was a nice, you got to be there.

REED: That was Saturn number two.

WRIGHT: That was great. You were here until the mid '80s, is that what you said?

REED: I retired in ’82.

WRIGHT: 1982. You had gone from pre-space days to the [Space] Shuttle era, because the Shuttle had launched in ’81. Did you have any work at all that you did with the Space Shuttle?

REED: Oh, absolutely. All components of the Space Shuttle were tested individually: the vertical tail, the wing, and the fully assembled Shuttle, all were tested using aeroelastically scaled models.

WRIGHT: What were your thoughts as an aeronautical expert when you first saw the design of the orbiter?

REED: It looked like a slow airplane to me. But yes, we were heavily involved not only in the Shuttle program but also supported the Viking Mars mission. Because the TDT could simulate the near-vacuum atmosphere of Mars, a Viking Lander model was used to help find optimum locations for mounting wind sensors. Tests were also performed on the Lander’s parachute.

WRIGHT: You’ve gone a lot of places without ever leaving that wind tunnel, didn’t you?

REED: Oh yes. It was a job that you shouldn’t be paid for, it was so much fun.

WRIGHT: Oh, that's neat. You've seen the Viking lander and the Shuttle and the Saturn, plus corporate or manufacturer type of models. Were there any others that you remember that were very unique for a flying machine to come out of your tunnel?

REED: [Dr. Francis] Rogallo's fabric kite that was not a kite, a hang glider I guess it would be, it was considered as a recovery item for the Mercury or Gemini launch vehicle, and that was tested in the tunnel as well as parachutes.

WRIGHT: During those first days of the space race, many people, especially in Houston, were working almost round the clock to move the space program faster. Did you see that here as well with the testing that you were doing for some of the spacecraft that were coming through here? Was your area working as you mentioned the double shifts and long hours to get those done?

REED: Oh yes, double shifts were standard. On the Saturn models we also measured the unsteady pressure loads due to buffeting. We studied ground wind load effects on many of the launch vehicles starting with the Scout and followed by Titan and Saturn models and, as of late, the Ares vehicle.

WRIGHT: That's good. Have you been able to go out? Do they still let you come out?

REED: I go out there occasionally. I was what they call a Distinguished Research Associate for a couple years, after retiring. Also, I've been involved in setting up an archival library in the TDT for collecting, among other things, technical reports by people that retire, and box loads of documents, pictures and movies.

WRIGHT: Good for you.

REED: All that got organized thanks to my friend Bob [Robert V.] Doggett, who succeeded me as branch head. There is now a room dedicated to the archives of TDT and other things. Most everything stored has been cataloged on the computer, so one can go there and search out things.

WRIGHT: That's an amazing tool that you have provided for people. Good, that's great. When you were with NACA and then almost overnight it became NASA, did you feel any transition? Was there anything different from one group to the other?

REED: Of course in my work I had a transitioned from flight research to wind tunnels, at the very time it became NASA. I don't know which was which as far as affecting my career. I really don't know.

WRIGHT: You mentioned your wife earlier. Did she work out here as well?

REED: No.

WRIGHT: But your home was here in Hampton close by?

REED: Yes. One interesting aside. When we came here in 1948 there were other NACA guys my age that were new here. We all needed homes. There were six of us that bought property on a newly developed little dead-end road. We decided to build our own houses—literally. We helped each other raise the roof. In three years' period we had each built our own house, and were living in it. I still live in a remodeled and enlarged version that house.

WRIGHT: It's a well-built home.

REED: The others are all gone. Some went to Houston; the rest are probably in heaven by now. But I thought it was interesting that we didn't know a thing about building houses at the beginning, but at the end knew more than you care to hear about.

WRIGHT: The first one got in his house earlier, but the last one had a house that knew more.

REED: Yes.

WRIGHT: It's a beautiful area. We've enjoyed seeing so much of what's there. I guess you saw lots of changes on Langley as well, on the field.

REED: Oh yes. The Flight Research Division when I came here was located in the East Area. They had a hangar on the flight line. About five years later they moved to a new hangar in the West Area of NASA.

WRIGHT: That's interesting. Did you make a lot of improvements to the facility while you were there? Or did the facility stay pretty much the same?

REED: The wind tunnel facility? Oh yes. There've been many improvements. The horsepower was raised from 20,000 to 30,000. The data acquisition system made vast changes, as you can imagine. Going back to the Flight Division, there's one project that I probably should have mentioned. I was invited to a meeting with a very prominent former NACA person named Fred E. Weick. Weick had worked here in the '20s and '30s. He was a contemporary of Charles A. Lindbergh and Amelia Earhart and was of equal stature, but just hadn't received the publicity. He invented the cowl on airplanes which vastly improved the speed. He invented the tricycle landing gear, the Ercoupe design [two-seat airplane] was his. At that time he was at Texas A&M [University, College Station, Texas] designing an agricultural spray plane called the Ag-1 [single-engine aircraft]. He'd come to Langley for some assistance in that project.

I was asked to go to a meeting just to sit in to see if we could do anything to support him in the Flight Research Division and I was given an assignment. One of the problems that Weick was curious about was where to locate the nozzles on the airplane to improve the uniformity of spray distribution on the ground. I was asked to look into that analytically. I spent a great deal of time developing a math model to follow the trajectory of each little droplet after it left the airplane. The droplets would pass through the trailing vortex wake, which moved outward and downward behind the airplane.

After the equations were derived, they were programmed on a Bell Relay Computer, which filled a room located, in what was then the 19-Foot Tunnel building, now, the Transonic

Dynamics Tunnel. The relays used in the computer were the same as those used in telephones at the time.

You'd assign a droplet size and a nozzle location, and the computer relays would go *clackety clackety clack* all night long computing the trajectories and locations where the droplets would land. This was done for many different droplet sizes and flight conditions. The next morning you would analyze the information, which was recorded on a ticker tape. Results from the study were reported in NACA Report 1196 in 1954. Just think, today these same computations could probably be done on a smart phone in the blink of an eye.

WRIGHT: That's very interesting. I'll never look at a crop duster the same way again—because we still see them, so it's interesting that you worked on that so long ago. Reporting and publishing reports was very important, wasn't it?

WRIGHT: I was going to ask Sandra. Do you have any questions or thoughts?

JOHNSON: I was just wondering, coming in being a pilot yourself and then working with the research with the test pilots at the beginning, do you feel like being a pilot as opposed to just studying and being an aeronautical engineer but also being a pilot, do you think that helped you as far as your work?

REED: Oh yes, I think so.

JOHNSON: You knew test pilots. Did you ever have any desire to be one yourself?

REED: No, not really.

JOHNSON: That was a quick answer.

WRIGHT: No regrets, huh?

JOHNSON: I think that takes a special personality.

REED: But I did fly for another 10 years for the Navy as an inactive reserve, they called us weekend warriors. I went over to nearby Norfolk [Virginia] on weekends and would fly SNJs [North American Aviation T-6 Texan].

WRIGHT: That was an easy commute. Didn’t have to go far.

REED: Then after retiring from NASA I worked another 15 years doing similar work for a company called Dynamic Engineering and did quite a bit of consulting for the FAA and others.

WRIGHT: You got to see it from a different angle. Did you do a lot of interaction with the FAA when you were here at NASA?

REED: During the Lockheed investigation of the Electra we were heavily involved with the FAA at that time, yes.

JOHNSON: Was that something that they did often like if airplanes crashed? You said with that one it's because people were killed and there was a problem with the flutter. Did it happen throughout the time you were there that other aircraft that were having problems, they would come in and try to figure that out?

REED: In my particular area, I've attended crash investigations for the National Transportation Safety Board. Also, I understand that NASA Langley was heavily involved in finding the cause of and cure for a structural failure in the vertical tail on a commercial transport aircraft.

JOHNSON: That's an interesting benefit.

WRIGHT: All the years that you worked with the wind tunnel and technology has changed as our lives keep going on, there may even be some that say you don't need wind tunnels because we have computer models. What's the value of knowing that the wind tunnel does what it does?

REED: Because wind tunnel testing is closer to mother nature. Things that may not be discovered on computers, because you didn't know the right questions to ask, might be uncovered by testing in a real-life environment. That's happened many times I think. Some may say wind tunnels are out of style now because we can do everything by analysis. I don't agree.

WRIGHT: You've seen many years of changes, plus you use a computer to help do your analysis, but yet the wind tunnel still offers its own unique benefit, doesn't it?

REED: Many of the wind tunnels that were active at Langley have now been destroyed or mothballed. At one time there were as many as 50; now you can probably count them on the fingers of one hand.

WRIGHT: We're glad to see the one that you were with is still running.

REED: Yes, I'm certain the need for having the unique capabilities of TDT will be there for a long while.

WRIGHT: That's good. Are there other areas that you can think of that you wanted to share with us? Some other thoughts?

REED: It's interesting that one of my earlier projects at FRD involved shaking an airplane (F-86D) in flight. Then, 40 years later, I found myself again in the business of shaking airplanes in flight, this time, as a Designated Engineering Representative of the FAA for flutter and vibration certification. As a part of clearing a new or modified airplane for flutter, its structural vibration modes relating to flutter are measured as the airplane is shaken in flight. For this purpose, I helped develop and patent an in-flight shaker system while employed at Dynamic Engineering Inc. known as the DEI Flutter Exciter.

It is an airfoil with a rotating cylinder that runs span wise behind the airfoil's trailing edge. The cylinder is slotted on opposite sides so that when it rotates at controlled frequencies the air flow produces a sinusoidal lift force on the airfoil in much the same way an oscillating trailing-edge flap does. The device is in use worldwide in flight flutter testing of commercial and military aircraft. Last count, revenue from its sales exceeded $10 million.

WRIGHT: I probably won't now get into an airplane without thinking of you.

JOHNSON: We're all a little safer.

REED: I might tell a little story here involving the DEI Flutter Exciter system. A company at a nearby airport was under contract with the Navy to tow target using Learjet aircraft with the target containers mounted under the wing. I was contacted by the company to do the analysis and flight tests required by the FAA to show that the target-carriage configurations would be flutter free. For the flight tests, we attached a DEI Flutter Exciter to each wing-tip tank. When the pilot came to inspect the setup we had a short conversation that went somewhat as follows:

> Pilot: Pointing to the flutter exciter, "Now tell me, just what this does."
>
> Answer: "It shakes the wing in order to measure the vibrations at different frequencies and airspeeds."
>
> Pilot: "Well, has this system been used before?"
>
> Answer: "Yes, it's been fully tested in wind tunnels, but not yet in flight."
>
> Pilot: "Oh? Where will you be during the flight test?"
>
> Answer: "I'll be in the chase plane photographing the test plane."
>
> Pilot: "The heck you will. You'll be in the test plane WITH me."
>
> Plans were changed accordingly and all flights in the program were successfully flown.

JOHNSON: If he was going to shake, he wanted you with him.

WRIGHT: You're used to pilots, so I'm sure nothing surprises you about pilots. I take it it all worked out well.

REED: That's right, but I guess he had the right to be a little concerned. This was the first time for the system to be used in actual flight tests. It has since been used in research and flight testing of a large variety of military and civil transport aircraft.

WRIGHT: A lot of confidence they must have had. How big is the device, the flutter exciter?

REED: How big do you want it? They make all sizes.

WRIGHT: What a perfect answer.

REED: For wind tunnel models it's the size of a business card. For fighter aircraft, like the F-16 or F-18, it's about the size of this page. For the Lockheed 130J [Super Hercules], to be sure of having enough shaker force, it was designed to be about the size of a small playing-card table, which, in flight, produced much more force than needed.

WRIGHT: They learned something, didn't they?

REED: I retired from that company in 1996 and since then I just do just about whatever I want, i.e., with the wife's permission.

WRIGHT: Sounds like you're busy. Thank you for that story. I'm glad you told us that. Anything else you can think of? That was a good one. Any more that you would like to share?

REED: No, I think that's it.

WRIGHT: It's a good way to stop?

REED: Yes.

WRIGHT: Thank you. We appreciate it.

[End of interview]