

University Corporation for Atmospheric Research
National Center for Atmospheric Research

Electra Oral History Project

Interview with Peggy LeMone
October 3, 2001

Interviewers: Diane Rabson, Nicolle Alida

Archives: This is Diane Rabson of the NCAR Archives. Today, October 3rd 2001 Nicolle Alida and I will be interviewing Peggy LeMone of the MMM division of NCAR. We will be talking about the Electra aircraft, which after 25 years of service, was recently decommissioned by NCAR.

Well, Peggy, we are going to let you to expound as much as you would like today, about the Electra. And basically we'll start at the beginning. When did you first acquaint yourself with the airplane?

LeMone: Well, we had a kind of a shakedown cruise out of Wallop's Island. You should talk to Don Lenschow, he was also on this trip. I think it was either in 1973 or 1974, and we were flying through some of the most turbulent air I ever flew through, because they had a record cold air outbreak, so it was REALLY cold air and the Gulf Stream was very warm. I remember it looked like "Dante's Inferno;" there were "steam devils" coming up to cloud base, and we were flying through this, up and down. All of us got the flu, as in upper respiratory stuff, headache, and everything. So it was pretty miserable!

Archives: What was this project, what was the name of it, what was the purpose of it?

LeMone: Oh, the original, the one at Wallop's Island, basically I think it was a shakedown cruise for the Electra. And I don't know if it was the first shakedown cruise. But I think the first experiment, the first big one, that the Electra went on (again Don Lenschow would be a good person to talk to about this) was AMTEX. The first trip to AMTEX, the airplane never made it there. I think it was supposed to be in the spring of 1974. Don Lenschow, Bill Pennell, myself, Andy Bunker (from Woods Hole), I think Chris Church (from Purdue), and Bob Grossman were all flying to AMTEX together. We made it about halfway to Hawaii. The airplane depressurized. So we all had to put on the oxygen masks until the airplane went down to 10,000 feet, or wherever it is safe to fly indefinitely without oxygen. And by the time we got back to Oakland all of the emergency lights were on in the airplane. There were some other problems, too, I think. We landed, and I think there was a fire engine. The problem with the fact the airplane lost pressure had to do with one of the air pressure units (APU's) went down, but there was also trouble with an engine. So they kept flying up to Seattle trying to get this engine

problem fixed. So we had to stay in Oakland for a week. Waiting for something to happen! Some of us had work with us, and we toured the “Wine Country”, then we ended up just having to fly back home again.

Archives: At this point you were a “Scientist I” at NCAR?

LeMone: That title didn’t exist then. I think I was a “Staff Scientist”. And I don’t know if there was a “1”, “2”, and “3” in the title. Bill Pennell, and I, and I think Bob Grossman were part of the NCAR GATE group, which might have been the GARP Task Force, at the time.

Archives: Because GATE was part of GARP?

LeMone: That is right.

Archives: I recall a very poignant part of Joanne Simpson’s interview with you where she talked about how she wanted to board aircraft to do her science, and there were these “unwritten” rules that how woman could not be on the aircraft. But I assume by the 1970’s that that was not a problem for you?

LeMone: Nope. Not a problem at all. The only problem, which at the time I didn’t think was a problem but these days might be, was that in the very back of the Electra there was something labeled “The Crew Lounge” and there was a bunch of “Playboys” in the back. But I read them too. No, I only read the articles...

Archives: ...and the book reviews..

LeMone: And the book reviews. Actually I loved the cartoons....

Archives: So we had just acquired the Electra when that happened, the “shake-down cruise”?

LeMone: Yeah, I think that is right (and again Don Lenschow would be a really good person to talk to about that with because he was really involved in getting the Electra ready.) I think GATE was the excuse, and maybe AMTEX also, but NCAR realized that it needed a longer-range aircraft for experiments like that.

Archives: What other aircraft did NCAR have at the time?

LeMone: Let’s see, I think they had the Queen Airs, I think they had two Queen Airs. I think the Sabreliner was there. Around that time, the first aircraft that I flew on at NCAR was the Buffalo, which was a very interesting aircraft. It had a square fuselage, it had wings that were at the top, and there was a little bubble where you could observe what was going on directly on top of the aircraft. In fact, one of the experiments we were trying to figure out what the interaction was between the airflow of the low-cloud base and where the clouds were. So we would have somebody in a chair, with an event-

marker, looking up and saying, “OK, the airplane is going under cloud NOW” and then they punch a button. Then, “It’s going out of under cloud NOW.” So we could tell when the aircraft were below cloud. I actually used that in a paper to document the relationship between cloud streets and overlying roll vortices, to really demonstrate that they were related to boundary layer flow. At the time most people thought they were, but there were some skeptics around who thought that they might be just gravity waves at the top of the boundary layer might have nothing to do with the boundary layer. Also at the time several people thought that tropical clouds had no “roots,” they just kind of drew air off the top of the boundary layer. And that’s what they thought. And this is probably more an instrumentation problem than a perception problem. The people who did the first work did not have fast humidity instruments and starting at about a third of the way up the boundary layer water vapor causes the buoyancy, rather than temperature, so they simply couldn’t see the roots. So we demonstrated that, yes, they did have “roots.”

Archives: So, was that part of AMTEX? Or GATE?

LeMone: That was the Puerto Rico Experiment and that was the Buffalo. That was Bill Pennell, myself, Fritz Hasler (who is now at NASA) and Ed Zipser, who is in Utah.

Archives: I’m wondering, on the Buffalo, was that dome originally the navigation dome where they would do the celestial navigation?

LeMone: No. I think that was put in for science.

Archives: That was definitely for the observation. Some of the old bombers I’ve seen have the navigation dome, like a window...

Archives: Also, I think the B-17, when I went on there, they had a waist gunner. You know they would be on the middle of the plane, they had a bubble and they would have an area for their gun to shoot.

Archives: What did the Electra look like when we first got it? Did it still look very much like an airliner, with seats in it and...

LeMone: Well, I never saw it before I flew at Wallops Island. But the one thing I remember most: it was yellow. It was purchased from the King Ranch, I understand. Its call numbers were “November 5-9-5 KiloRomeo.” With “K R” presumably being “King Ranch.”

Archives: And then later we changed the numbers.

LeMone: That’s right, we did.

Archives: I didn’t know the end numbers could be changed.

LeMone: It was changed sometime after GATE, because all during GATE it was “November 5-9-5 KiloRomeo.”

Archives: Right. It looks like before 1978, it was ‘King Ranch,’ “KiloRomeo.” Then in 1978 the number became N308D.

LeMone: Yes. All of NCAR fleet by the late seventies, there was “3-0-6-Delta”, “3-0-7-Delta,” you know they were consistent numbers. In the end I think “November,” I think US aircrafts tend to have that. (That’s a little trivia.)

Archives: So, when you went on the GATE project you referred to the plane as “Tweety-Bird”?

LeMone: Right. A lot of people did. A lot of the airplanes had nicknames. The British airplane, the UK C-130 was called “Dumbo,” after the elephant. It was big and lumbering, it didn’t have big ears, but it did have a radar on it.

Archives: And was it blue or gray like “Dumbo”?

LeMone: Yeah, I think it might have been gray.

Archives: “Tweety” was yellow. Do you have any pictures of it?

LeMone: I do have picture of it, and I was going to bring them in today and I couldn’t find them. And I thought they might be here. But I could supply you with picture of the yellow Electra.

Archives: It would be great to see all of the incarnations of it. In the RAF data catalog, the projects with the prefix of “5” are the old “N” number on the plane. And then when the N-Number changes then the prefix changes to “8.”

LeMone: That’s interesting. I guess because it’s “November 5-9-5” and then it was “3-0-8-Delta.”

Archives: Do you want to talk about the GATE Project, the airplane’s role, and your role?

LeMone: Sure. The GATE project, the objective, as I remember it, was to figure out how scales interacted. i.e., how convection interacted with weather systems. In that part of the world, the relevant weather system is something called an “easterly wave” which would go by Dakar about every four to five days, travel westward, as I remember, about seven meters per second, have a wavelength something in the order of 5,000 kilometers. And these are often associated with the origins of tropical storms and hurricanes. So that from the weather point of view, people were interested in what caused hurricanes. From the more general forecasting point of view, they were interested in how to represent the effects of convection in forecasting models and, later, in climate models. There were a number of people—VicOyama, Arakawa—who were developing schemes to represent

the effects of convection so they could be accounted for in a numerical model. You talk to some people, in fact, I got into a very interesting discussion with Eric Barron about five years ago, talking about GATE, because he always thought of GATE as a climate experiment. In fact we were talking about the relative ease of funding weather vs. climate. He said, “Well, the climate people learned from the GATE experiment, and then one experiment followed each other like cars on a train.” And I thought, “Now, wait a minute. GATE wasn’t a “climate experiment.” I was in GATE. Then we remembered that there was no separation between weather and climate in those days. It was all atmospheric science. It was a big international experiment, maybe the biggest we’ll ever have. I don’t know. It had 72 different countries in it. Ships were stretched across the Atlantic Ocean. They were basically in a nested array. There was an array of ships stretched across the entire Atlantic Ocean and then in the East Atlantic there was what was called the “A-scale” array, which was kind of a big hexagon and then within that, was the “B-scale” array which was a smaller hexagon. There are pictures of these in various references. But what the aircraft would do was fly out to the B-scale array and document the convection to the detail possible at that time. But the aircraft had several different missions. The aircraft were, of course, to document the convection because we were trying to parameterize it, but also to document the fair weather boundary layer, because we were still trying to understand that and conditions in between what we call the “disturbed” (which is the convection) and the fair weather—so the intermediate state. We were also interested in looking at the radiation. So there were special flights designed to study how radiation was transmitted through the tropical atmosphere. And there were people interested in looking at dust from the Sahara and its effect, (Joe Prospero, I remember, was involved in that.) And there was a group interested in looking at the microphysics of the clouds as well. So there would be—and this brings us to my role, and NCAR’s role; our group, namely, Ed Zipser, Bill Pennell, Bob Grossmen and myself, and Al Miller, who was hired to help with the job that we were given the task of writing the first draft of the GATE aircraft plan.

Archives: How many aircraft were involved?

LeMone: Lots. The number 13 sticks to my mind, I’m not sure if that’s right. I can rattle them off. There was a Convair 990 from NASA. There were 2 Ilyushin 18’s from the Soviet Union. There was a DC-7 from France. There was a C130 from the UK. There was an Electra from NCAR –U.S. There was a DC-6, 39-Charley, that was from the US, that was by NOAA. There was a C130 that was also NOAA. NOAA 41, they were NOAA 39, and NOAA 41. There was the Saberliner, from NCAR. There was a p3 from the Navy. There was a Queen Air from NCAR. And there was a KC135 that dropped sondes, that basically was a dedicated to dropsondes aircraft. So, what was that? 12. I’ve got a picture of them all lined up on the tarmac at Dakar Yoff Airport. When you flew a coordinated pattern, you would have several aircraft at once, typically, for example, if you were flying through what we call the cloud cluster (which is something if you are looking down from satellite, you see a big white blob which is basically the anvil of what all cumulonimbus clouds are underneath.) The aircraft would be flying through the cloud to get in-situ data. Because we had some radars but we had no airborne Doppler radar at the time. And we had radars on the ships, but again it was not Dopplerized. So we would

get the wind field through these storms and if they were two dimensional we would just do a linear pattern. We would just go back and forth at different levels across the line. If it was a more complicated pattern of clouds we would do what we called the “butterfly pattern” or the hurricane people call it a “figure-4” and you just go back and forth like this. Then there were patterns where aircraft would fly around over a large area to get the convergence into that area. But a typical flight through a storm would have the DC-6 at the lowest level, the Electra typically flew somewhere near cloud base, the UK-C130 typically flew about 1 and ½ kilometers from the surface, which was above cloud base. The US C130 would fly at intermediate to high levels somewhere around 3.3 kilometers up to about 6 kilometers, the Convair 990 would be flying up at the highest level, and on occasion the Sabreliner would fly at the highest level but it did not have the range really to do that because it was like an hour ferry, or something like that, from Dakar. So you had to have long-range aircraft to do this.

Archives: If the Electra was the only long-range aircraft that NCAR owned, how did the Sabreliner and the Queen Air get over to Africa? Did they do a lot of “hopping”?

LeMone: They must have done a lot of “hopping”.

Archives: Can you describe your trip? Did you go over in the Electra?

LeMone: No, I went over on a commercial airliner out of Newark. In fact there is a cartoon commemorating that experience in the cartoon GATE book. As I remember, there was a delay, and it was not the best part of the Newark Air-port. We figured that the people going to Africa they didn't want to bother with, or something, I don't know? But we got there in the morning. And I remember there were all kinds of people descending on us to carry our luggage and all of this stuff. But I remember checking in my rooms, and went to breakfast, and we were all completely out of it.

Archives: So was the Electra already there when you got to Dakar?

LeMone: I don't remember. I was unconscious the first few days. All I knew was I was there. But we had spent so much time preparing for this thing, that the last weeks we had all these things to send over, and the admin. person at the time was Pat Jones, and she spoke French, and I knew some French. So we ended up doing all of this extra stuff that wasn't even scientific.

Archives: Like what?

LeMone: Oh, like putting together manifests for stuff going in, and stuff like that.

Archives: ... and translating that into French?

LeMone: I guess so. I can't remember. I remember helping Pat with a lot of stuff late at night and just being totally involved in this. In fact this was all during when Watergate

was breaking, and I just missed Watergate entirely because I was so wrapped up in GATE. In the real GATE, as opposed to Watergate.

Archives: Did you have a lot of diplomatic work to do to arrange the availability of the airstrips and so forth?

LeMone: Not me. No, my work was strictly scientific.

Archives: So it was pretty free coming and going and traveling..?

LeMone: Yeah. There were other people doing that. I think Gene Prantner, I think is the one name that comes to mind. Joach Kuettner, by the way, was the overall director of GATE.

Archives: I didn't realize that.

LeMone: And he is gifted, as a diplomat. In fact he would be a good person to talk to about GATE. He would oversee the "Mission Selection Team" which was the group that decided each day what the aircraft would do. And we had a representative. There were representatives from Germany, the US, the Soviet Union, France, and England, I think, on this "Mission Selection Team". And initially they kept translating everything to French and Russian, but they finally gave up. And one Russian guy would do informal simultaneous translation, and all of the Russians would sit together so the Russians would know what was going on. We always knew when the meeting had bogged-down because the Russian translation would STOP.

What they would do was they would meet and they would decide the mission for the next day, they would name what was called a "mission scientist", which was the person who controlled the mission from Dakar. Basically figured out the detailed flight plans, figured out the takeoff times, and helped do the briefings, and in theory (according to the flight plan) they were supposed to direct the mission from Dakar. In practice that didn't work very well because radio communications were very difficult. So what ended up happening is the airborne mission scientist turned out to be the main person who really ran the mission from the air. You know they basically all fly out to what they call an "I.P" (initial point) and then each aircraft would be assigned a level and then they would fly back and forth. And if the system were traveling, then they would have to keep adjusting the pattern westward. This was quite a challenge. So, one of my jobs I was mission scientist, I was airborne mission scientist, (there was a whole pool of people, you would get picked once a week, or something) and then the other times I was fairly typical. I would be an airborne scientist, which meant I was just this scientist for the aircraft –the one to communicate with the airborne mission scientist. To let them know what I was seeing, or what my recommendations might be. And sometimes there were some very funny "Blind Men and Elephant" stories that airplanes at one level were saying, "We're not seeing anything?" and airplanes on another level saying, "What do you mean, this is really exciting!!" So it was always fun to go back and kind of compare notes and wonder if you were in the same atmosphere.

Archives: So, it sounds like radio communication between the aircraft was possible, but not so much with the ground?

LeMone: That's right. Because the ground was too far away. Because the ground was at Dakar. You know we did have satellite images coming in once every half an hour. Basically infrared and we also did have, you know, visible, but you really could not see everything that you needed to see. In those days the aircraft couldn't get satellite pictures. We would take the latest one on board with us. Then would also be some communication with the ships because in the "B-array", that's where we flew. There was a even "C-array" (which was quite small-scale) where concentrated work was done, in the third phase of GATE.

Archives: so what was it like to go up in the Electra?

LeMone: It was fun. We generally started flying in the early morning, and did missions during the day. We had C-rations: "one meal, in-flight, individual" was on the cover of the C-rations and then we would always say, "With liberty and justice for all!" So literally everybody in the Electra got C-Rations, and Ed Zipser had bought "breakfast squares" which are pretty awful. That was our fare on the Electra. We would typically be seated at a table about like this, about a yard wide, there would be two of us at a table and each of us would have a microphone and we'd take notes. In those days, (this was before we had the nice soft-ware they have now over at RAF) when we did a sounding we'd have somebody reading off numbers and then somebody be plotting it. I remember Jeannie Kelly always used to do this. We would always have a student on board to help plot data, for soundings and stuff. We would have maps, we would have pre-prepared maps with ship positions, latitude and longitude on them so you could keep track of what was going on during mission. And all of the stuff is in the Archives, we saved it all.

Archives: It's true.

LeMone: So, a typical flight, we would go out, we usually had already had breakfast by the time we went out with this incredibly strong French coffee that came in cups the size of soup mugs.

Archives: Keep you going all day...

Archives: Could power the airplane!

LeMone: Oh, yes. And then we crashed. I always crashed about 4 in the afternoon (me, not the airplane!).

Archives: How long were the flight days? Was the endurance of the aircraft about 8 hours, or so?

LeMone: On the Electra the length of the mission typically lasted about 7 hours. So what would happen: the UK C130 would generally go out first because it could fly for 11-12

hours (they also had the best breakfasts; they had scrambled eggs, but they were green scrambled eggs. The people with small kids would say, “ I do not like them, Sam-I-Am. I do not like Green Eggs and Ham.”)

So the airborne mission scientists always flew on the UKC130. That was great fun. They would kind of scout out the area and find an area, and then the other aircraft would fly by, and then the airborne mission scientist would give them a point where we were supposed to meet, and then would assign a heading and an altitude, and we basically flew the mission. In fact we had a representative of the FAA there, in Dakar, and we basically had our own traffic control, I think.

Archives: That’s a good point. I hadn’t thought about air traffic control, but you’d need it because you had so many [aircraft].

LeMone: There’s some interesting stories about that, too, because the air traffic controllers at Dakar were overwhelmed by us. And one time, the British aircraft actually took over air traffic control. Because they were vectoring a GATE aircraft and a commercial aircraft on a collision course!

Anyway, the Electra mission would last about seven hours. And then we’d come home, and get debriefed in the afternoon. And then, we’d typically stagger back to the hotel, go out to dinner and start the next cycle the next day.

Archives: Did you go every day?

LeMone: I think the schedule was we tried to alternate days on and days off, and basically Bill Pennell, Bob Grossman and I were kind of rotating in and out as chief scientists on the Electra. So what would often happen was we would work two days out of three. Or sometimes if once of us was assigned to be airborne mission scientist or mission scientist, then we wouldn’t fly in the Electra. But we would at least get one day off out of three.

Archives: Did we have extra pilots along? Were they rotating out as well?

LeMone: I’m trying to remember. I remember Zinser and Covington—Bill Zinser and Jim Covington—were the primary pilots for the Electra, and there may have been others as well.

Archives: Was there anyone on board taking photographs, you know someone from NCAR like Charlie Semmer?

LeMone: I don’t remember, but I sure took a lot. I got a whole notebook full of them at home, that I should bring them in and let you guys look through at your leisure. Yes, they’re all slides. You can look through them. A lot of them are clouds. Then there’s the famous—somewhere I have a file that has some of the pictures that Joanne [Simpson] took, or maybe I’ve turned it over to the Archives because there’s a lot of people figured

NCAR would be kind of an informal receptacle, so Joanne would send me a lot of copies of a lot of the things she did.

Archives: Joanne Simpson? Where was she?

LeMone: At the time, I think she was at the University of Virginia.

Archives: Was she married to Bob Simpson at the time?

LeMone: Oh, yes. In fact, Bob was out there, too. In fact, very often they typically rode—or Bob typically rode—in the dropsonde aircraft, and it was really funny how different his impressions were from the rest of our impressions, because of the different heights we flew at. Joanne would typically fly in the US C-130, and she was frequently airborne mission scientist as well.

Archives: How long did this project go on?

LeMone: Well, I think we arrived about June 8, and I left September 24. It was basically all summer. We were the “lifers”. I mean some of the people got breaks, but we (the people from NCAR) basically stayed the whole time.

Archives: What was it like being in Senegal [during] an African summer?

LeMone: Hot. It was really interesting. I mean, the sky was often very, very hazy. But the fascinating thing was at night, you could see all the stars because there was no light pollution, very little.

Archives: Did everyone stay healthy throughout the trip? You all had vaccinations?

LeMone: Oh, yes, we took our malaria medicines and all that stuff. In the early days it wasn't quite as bad as Larium we took in TOGA-COARE, but there was one guy who actually had hallucinations while he was taking it, but fortunately it resolved as soon as he stopped taking it.

The rest of us didn't have any trouble. The only time I ever got sick, I got something that was extreme shaking chills, and it lasted about 24 hours. The funny thing was, I didn't feel bad, but I was really cold and shivering and all this stuff and that's the only time that I got sick. I think it varied a lot, but I was pretty healthy. Just tired, I remember being very tired. And one of the problems was, we didn't have a doctor at first. I know Ed Zipser and Stan Ruttenberg, who was taking care of some of the logistics, I think someone named Jane Aschenbrenner was also taking care of the logistics. I know Stan and Ed worked very hard to get a doctor. Finally, we got one and I'll never forget when he arrived. He was a real young-looking guy, and showed up with his wife who was real young-looking, and I said, “Are you some new graduate students?” And he looked at me and said, “My name is **Dr.** David Jones. I am your physician.” He works in the ER now; I think he runs the ER at Boulder Community Hospital.

And then there's another guy named Takahashi, who was a pediatrician, which was perfect.

Archives: That's appropriate!

LeMone: I think NCAR should have a pediatrician. We had our pediatrician there. When we needed them, we all had to get hepatitis shots in the middle of summer, because they don't last four months, so we had to get a booster.

Archives: So did you eat the native food?

LeMone: I ate some Senegalese food. In fact, I have a Senegalese cookbook at home that I've gotten some interesting recipes from, but the only time—most of the food we ate was French, because we lived right next to the airport in a "luxury" hotel. We were at the Hotel Diorama. There's a "Taranga"—it's probably all in here, I don't remember all the names of them—but we had several French restaurants around, and there was a really nice Vietnamese restaurant nearby. So we would kind of alternate between French and Vietnamese. We did go out into the bush during what we called the "Interphase"—GATE was divided into three phases, so four of us drove around together in the bush. We went to Gambia, down to the southern part of Senegal, and we went to one restaurant that was out in the bush and it had this really long menu, and we kept trying to order things, and find that they didn't have anything on the menu. And finally, we said, "What do you have?" They took us to the kitchen and pointed to a big pot of soup. Then they pointed to the chicken out in the backyard, so we figured there were two items on the menu. One was chicken, and the other was soup—we decided to opt for the soup, which was very good.

Archives: Were you responsible for any particular instruments on the Electra?

LeMone: The way they ran it, they actually had technicians who took care of the instruments. For example, Arden Buck, who's now in private industry, would babysit the [Limon Alpha], and I think Neil Kelly was out there, and I can't remember all the names. There were a lot of technicians. The Electra had a navigator, too, on board, I remember. I don't think you'd see that very often anymore.

Archives: So Buck and Kelly worked for Facilities.

LeMone: Yes, and Dick Cormack was another, and Jacques Brun was another technician. My role was that of a scientist. We actually had to write reports on everything and all this stuff, and afterwards there was a big effort in data validation; the NCAR GATE group did this. It was a big job. This was for the aircraft data only, and we basically had to go through every minute of aircraft data and evaluate it and flag that data. This was all done by hand. And evaluate it as good or bad. It was interesting: there was so much variation. There was one guy who was a synoptic meteorologist. Every time he flew anywhere near a cloud, he would reject that data as bad. So we had to ignore his flags. And I think there was some objective test. But there was a lot of subjective stuff. I think

we spent a year doing this. And we had done this from the American aircraft, and then three of us wrote a paper comparing the fluxes from the UK C-130, the NOAA DC-6, and the NCAR Electra. It turned out to be very political and very sensitive because you are pointing out problems with other people's airplanes. Steve Nicholls from the UK (who was an absolutely wonderful scientist, unfortunately died in his thirties from leukemia) was over for a year to help with the UK C-130 data, and the Russians, a couple of Russians, came over with the Ilyushin-18 data. There are some great stories about them. They loved "Dr. Strangelove."

Archives: They had good taste. So, they were in Boulder working with you?

LeMone: They were in Boulder working with us.

Archives: They were considered official visitors then?

LeMone: Oh, yeah. They were official visitors, as official as any visitor to NCAR, that just happened to be from the Soviet Union. Which looking back on it, during the Cold War, is pretty impressive.

Archives: Yes. Now wasn't the JEC going on at the time? Or were they already done with that?

LeMone: That was 1973. That was kind of over. I remember that somewhat vividly, kind of a turmoil, kind of running back and forth between that and the GATE aircraft plan. And you know there was a lot of staff activism at the time. I think the Council for NCAR Women was active at the time. So it was an exciting and busy time.

Archives: Are there any other projects that really stand out in your mind in terms of being on the Electra like TOGA-COARE or something before that?

END OF SIDE 1

Interview with Peggy LeMone Regarding the Electra

SIDE 2

LeMone:.... You know, just spend a whole year just sitting and looking through data. In fact after GATE there was a request that NCAR help evaluate another data set, and they just refused to. They were afraid that our careers would be ruined by just sitting and looking at the data. Because our publication rate was like zero. You spend so much time organizing a field program then you have to look at all of the data by hand and it's really hard to get anything done doing that. So it was, I think, one of the incidents in a long series that lead to the creation of something like JOSS [UCAR's Joint Office of Scientific Support.] Of course a lot of the data quality assessment now is either up to the PI or done automatically. There is not enough of it done anymore.

Archives: It seems sad that you would mount a really big program and then the data just kind of sits there afterwards and isn't useful.

LeMone: After GATE I would say a lot of data got analyzed and the data are still up in the Archives. And I have used GATE data as recently as last year and there is a resurgence of interest in GATE because cloud resolving models are now at the point that they can start replicating what happened in GATE. So there are a lot of comparisons now done with at least the GATE radiosonde data and maybe the satellite data as well. Now TOGA-COARE, of course that was, well, let's see, GATE was in 1974, TOGA-COARE was 1992-93, and there are some big differences. Well, first of all, there weren't as many aircraft. Second of all the two groups running the experiment were separated; one was in Townsville running the overall experiment and the group in Honiara that was running the aircraft.

Archives: So you were with that group?

LeMone: I was with that group, Yes. And there were some severe problems during that experiment, which is described in my TOGA-COARE cartoon book. But I would say the most fundamental problem with TOGA-COARE was that a lot of the data--I don't know if this is true, but what happened with TOGA-COARE is just a few years after the experiment some high level committee decided that no more data analysis proposals would be accepted and henceforth there should just be modeling done. So a large group of us ended up never seeing the data we had collected or proposed to analyze. Now, you know, I fortunately, I was interested in two different things. I was interested in the deep convection and that data was out quickly and we could deal with it. I was also interested in boundary layer fluxes and we never saw that data, except for the Electra was the only one that produced it. And this brought forth a very interesting issue because NCAR has had years and years of experience of producing data sets. They produce them quickly but they're not perfect and because they are produced quickly they can't be perfect. One of the scientists took it upon himself, and unfortunately the funding agencies funded him to do this, to process the data from the two NOAA P-3s, and he wanted to do it "the right

way” not the NCAR way. Which meant that by the time that he got the data processed we were all out of money, we’d lost our funding, so we never saw the data. This affected quite a few people.

Archives: How many people and how many instruments were on the Electra, would you say during TOGA-COARE?

LeMone: Tons. I would say the difference between TOGA-COARE and GATE, the fundamental difference was that the Electra and the two P-3s had airborne Doppler radar. It totally changed the way that we sampled things. But many of the procedures that we used in GATE were also used in TOGA-COARE.

Archive: Like what kind of procedures?

LeMone: Like, you know, having airborne scientists, and having a lead aircraft. Although there were not nearly as many aircraft involved, so it was simpler, and in some ways it was easier to tell what was going on because you not only had decent radar in the aircraft but you had Doppler radar in the aircraft.

Archive: Was the Electra ever a lead aircraft in that project?

LeMone: I don’t remember. We certainly did a lot of missions on our own, we did a lot of boundary layer missions on our own.

Archives: Meaning for your own specific research?

LeMone: Well, it was for the field program but these sort of flight patterns could be flown by one aircraft.

Archives: I see. And that would have been done with the Electra?

LeMone: The Electra or one of the P-3s. But generally I think the Electra was not a lead aircraft for the same reason it wasn’t TOGA-COARE and that is that it just did not stay up as long as the other aircraft. And the lead aircraft typically had to go out first and scout, so the Electra was not well suited for that because it was not as long range. But I was on the Electra the day that ELDORA first worked. That was very exciting.

Archives: So the ELDORA instrumentation was on the tail of the Electra?

LeMone: Yes, that’s right.

Archives: So they had to basically create a whole new tail?

LeMone: Yes. And again there was a lot of coordination and cooperation between the NOAA group who had radar on the aircraft, and the NCAR group. I think there was a lot of interaction, I think maybe some NCAR people might have been involved when NOAA

was putting on its airborne Doppler radar. That's another interesting history it would be fun to explore. Dave Jorgensen, downstairs, would really know a lot about that.

Archives: Are you aware of any other scientific research labs that would have used an Electra or an Electra-type aircraft? Do you think the Electra was an unusual choice?

LeMone: Well, lets see... You know I can't recall anybody else using an Electra, but P-3's, of course, are very close. They had been used, as I said there was the one in GATE and NOAA has two P-3s for hurricane reconnaissance, and they use them for other stuff as well.

Archives: So they are turbo-props?

LeMone: Yes. Just a little more beefed-up version. They have longer range, I think they could withstand more turbulence slightly, at least that's what they told me. I'm trying to remember, I don't think, like in TAMEX (I was in TAMEX in 1987), the Electra wasn't there. It probably went to, did it go to Australia for.. what was it?.. EMEX? I'm not sure about that one? It was about the same time.

Archives: EMEX was in 1987, that was in Australia?

LeMone: Yes, Same year as TAMEX.

Archives: You mentioned the depressurization event before you launched GATE. Did you have any other major excitement with mechanical-type things, engine failure—did you encounter any icing when you were in the clouds?

LeMone: The first day going out in GATE, we flew through a cloud that must have gotten the Electra pretty close to stalling or something. All of a sudden, we went wump! like that. Then we flew at a lower altitude the rest of the day. And I put in my notes: "Downdraft." Bill Zinser, the pilot, later said that there was a lot of icing, and that's what happened. Now, whether or not the icing caused him to descend or whether he chose to descend because he could see that we were turning into an ice cube, is unclear at this late date. But I know where Bill is; we could ask him. We probably should call him. I've got his address.

Archives: He's in Arizona, is that right?

LeMone: No, he's out in California now. He moved again, but I have his address at home. He's full of stories.

One of the exciting things was, at one point, we were going to get to give the president of Senegal (Leopold Sédar Senghor) a tour of the Electra, which was really exciting. And since I spoke better French than any of the other scientists—which isn't very good!—I was going to give him the tour. And I was practicing my best French, trying to learn all the vocabulary words for all the instruments and I was just really excited about meeting this man because he was an incredible guy. He was the founder of

the *Négritude* movement, and he was a poet (when I told my daughter she was quite impressed—she took a course, kind of a “Great Civilization” course, at the college she’s going to—the first two semesters that are absolutely required are kind of the typical “Western Civ” and then the third one is kind of alternate ways of thinking. Apparently they studied Senghor, the president). But anyway, Bill Zinser and I were supposed to give a tour of the Electra to Senghor, and there’s this hangar across the way from all the other hangars in Dakar Yoff, and there’s always guys with machine guns around, and we were told when we first got there, “Never go over there, because you’ll get shot!” So comes the day when we were supposed to go over and give Senghor the tour and I said, “What do I do? What do I do? Nobody’s coming to pick me up.” And Bill Zinser looked at me and said, “Well, in this situation, act like you should belong there!” So, security be damned, Bill and I kind of walked over to the plane like we belonged there, and nobody shot us, so it must have worked.

The president never showed up. I don’t know what happened, that day, I guess there was some crisis or something, so we didn’t give our tour. But Bill and I had a nice afternoon sitting, chatting with each other in the Electra. And another thing that the Electra did, which was kind of fun, during GATE, they went to Ouagadougou.

Archives: Was that Upper Volta? Which is now...? [Burkina Faso—ed.]

LeMone: My memory of African geography is frozen in 1974. But Francis Bretherton was coming, and Bob White was coming, and I think a few other high-level dignitaries whose names I don’t remember. And they were going on a pure junket. They were going to fly these people to Ouagadougou. And I think one of the purposes was to look at the impact of the drought. Maybe there was a climate connection that Eric Barron likes to think of.

Archives: Bretherton was then President of UCAR and Director of NCAR, a double post?

LeMone: Yes. So it was either Bill Pennell, Bob Grossman or I who got to go on this boondoggle, which we called it. So we drew straws, and Bill won.

Archives: Very scientific method.

LeMone: So they flew the Electra to Ouagadougou, and they got to tour refugee camps. And I remember Bill coming back and Bob White and all these guys were saying, “Oh, my God, the conditions are really terrible at this refugee camp.” And Bill was thinking, having lived in Africa at that point, at least a month, he thought it was pretty luxurious. I mean, it was interesting how your concept of what’s normal and acceptable, changes. And these guys were just flying in from the US and thinking, “What horrible conditions!” But Bill was saying, “These guys have it a lot better off than the guys in the street in Dakar.” It was an interesting Electra story.

Archives: So Bob White, was he in charge of NOAA at the time?

LeMone: Could be.

Archives: Do you think they were dispatched by the National Science Foundation...?

LeMone: I bet. And again, some people, Francis would know, even Peter might know. There were some very high-level people on that plane. It could be the head of the NSF was one of them, I don't know. Something worth finding out. You know, this was the great NSF facility and let's fly to Ouagadougou and see about this drought—in fact, one of the things I remember they said on the national news at the beginning of GATE was that maybe GATE will help us figure out what caused the African drought. So there was the climate connection, and the hurricanes were the weather connection, but at the time, there wasn't a separate climate community over here, and a separate weather community over here.

Archives: So Bretherton and Bob White were already there. Did they come back to Dakar and did they tour, or go up in the plane—“

LeMone: I'm sure they must have toured GATE. Bretherton might have gone on a flight. He didn't do it while I was on the plane, but he might have. I'm sure they would have looked around the operation. And we had a building at the airport called the “GOCC,” the GATE Operations Control Center, and I'm sure they attended the mission selection team meeting, weather briefing, and so on.

Archives: And the ships were stationed out in their pattern, offshore? Did they come in for briefings?

LeMone: That was—you see, the phases, where the ships were on station, and there would be an interphase and they would all come in to port, and then there would be kind of a series of meetings for everybody to exchange information, talk about problems and then try to solve them. And there would be a lot of partying, as well, particularly—not necessarily altogether, there are some great stories of people coming on ships and getting into various kinds of trouble. But yes, the ships would come in, and then we would have meetings, and then they would go back out again. I think there were two interphases when they did this. There were some substantive things that happened at those meetings to improve things, for everyone.

Archives: The pilots, Bill Zinser and the other pilot, and the instrument technicians—was everyone kind of together like in one big family, or did they go off in their own—

LeMone: At least in my circle, we kind of did a lot of stuff together. In fact, Dick Cormack, Pat Jones and Jacques Brun and I used to do some things together, and I don't know if this is true for all the technicians. We all lived in the same hotel. I spend a lot of social time with Pat Jones, who was the admin person, so there was a lot of mixing. The one divide that there was, it was kind of sad, there were some bad feelings about some of the NOAA people, individuals, but people were pretty friendly. The Russians, we did some stuff with them, a little bit, but they kind of kept to themselves, but maybe that was a language thing, it could have been a security thing, too, for them, but in fact, a wife of

somebody at NCAR could speak Russian—she'd hang out with them. I think it was from her that I learned that they would sit on the beach and sing. I would love to have heard them. We had a party for the Russians once. I think Pat Jones and I kind of put it together, and it was really funny because after we had eaten and drunk for awhile and all this stuff, the Russians said, "Let's sing some songs." Kind of a Russian-American competition. And of course, the Russians start singing "Moscow Nights" or something—everybody knew it, they could harmonize and all this stuff, and they said, "OK, Americans, what are you going to sing?" Well, who knows this? I don't know that. Do you know this? No, I don't know that. And we could never agree on a song. So finally the Russians said, "Why don't you sing 'Rock Around the Clock?'" And nobody knew it! The Russians knew it, but we didn't know it. I think we could all sing the Star-Spangled Banner or something, it just didn't seem right for this particular party. It was an interesting contrast in cultures, how much music is a part of Russian culture. Of course, in the United States it is, too, but it's so diverse. Aside from the stuff you learned in grade school, people don't know...

Archives: We don't know to sing it. We're more listeners...

Archives: I was sort of embarrassed last week during Yom Kippur service. Afterwards we sang "God Bless America," and I forgot the words...

LeMone: They didn't hand it out to you?

Archives: No. And this guy turned out and said, "What's wrong with you? You don't know it?"

LeMone: I was at the baseball game and they sang "God Bless America" instead of "Take Me Out to the Ballgame." She goes to Yom Kippur services and I go to the baseball game!

And the funny thing was, I knew all the words to it and I remembered when I learned it, because I went to a school called Grant School, and I was in second grade, we were on the first floor, and the fifth grade was on the second floor. And they learned "God Bless America." We were drawing or something, or reading, and I thought, "Wow! That's a cool song," and so I went up to the teacher and said, "Miss Langenbach, can we learn that song they're singing up there?" And she said, "Well, that's really a fifth-grade song." I said, "I'd really like to learn it. Can we please, please, please learn it?" So she taught it to us. So we were very advanced second-graders because we learned "God Bless America." So for some reason I'm starting to sing and I get this vision, me in second grade saying, "Please, can we learn 'God Bless America?'" If you had been in my class, you would have known it.

Archives: I remember in 1952 when I was in kindergarten in Brooklyn, we started saying the "Pledge of Allegiance," but it didn't have "under God" in it, and about two months later, the teacher said, "You have to sing this." I remember being so angry because I

didn't know what any of the words meant anyway, and it just disturbed the flow of the whole thing.

LeMone: Well, it ruined Art Linkletter's great joke. This little kid—you know, he had a book named "Kids Say the Darndest Things," and it was the "Pledgeallegiance." And in the "Pledgeallegiance"—all one word—there was this one great phrase, "One naked individual with liberty and justice for all."

I'm trying to remember if I ever flew—was the Electra in STORM-FEST? Or, that would have been 1992, and then there was an experiment in 1985 called Pre-STORM, and I don't know if it was in that one either. Those were two experiments that I was in, that's why I was just curious as to whether the Electra was in there. I was grounded at some point because of my heart disease, so I didn't fly in airplanes for a long time. So I would participate in field programs and not be as aware of the aircraft because I was the ground controller, permanent ground controller.

Archives: Would you describe an aircraft as a platform for instruments, essentially, sort of like the bombers of World War II [that] carried people, stuck them wherever it could but mainly they were there to deliver bombs...

LeMone: You know, it's an interesting analogy, in GATE, several times, there were a lot of ex-military people back in 1974, there were a lot of people who had been through World War II. And they kept saying how much GATE reminded them of the war except for one marvelous thing: nobody [was] shooting at us. We would go out on missions, we would call them "sorties," we would count sorties and do the whole thing.

Archives: You'd call them "missions."

LeMone: Yes...and the UK C-130 was operated by the Royal Air Force, and Squadron Leader Lamb was in charge. He came in his shorts and his long socks, and he looked every bit like he walked right out of a World War II movie.

Archives: "Bridge Over the River Kwai."

LeMone: Exactly.

Archives: We have our Navy P-3.

LeMone: With all the interesting new things you have to do to fly on it. Pass the medical tests, swim blindfolded through a mockup fuselage with your clothes on to get back to the surface, among other things.

Archives: You're talking about the P-3...? Was there anything you had to know for the Electra? I mean, what kind of safety issues came up?

LeMone: For the Electra, I don't remember. For the (DeHaviland) Buffalo, we had to go through some sort of pre-flight training down at Buckley [USAF Field]. We had to go through de-pressurization and know what the symptoms were when you were starving for oxygen and things like that. We had safety lectures. I don't remember if that was required for the Electra or not, and it was certainly required for the Buffalo.

Archives: So when the cabin de-pressurized that one time, basically the oxygen masks...?

LeMone: I don't remember whether they came down, or somebody brought them out to us and said to put them on. I've been in a commercial plane when they came down. But they just came down, there was no oxygen problem, they just happened to come down.

Archives: The airplane was an instrument platform and also a little bit of a home away from home for people.

LeMone: Yes, we had the crew lounge in the back with the Playboys.

Archives: If anything went wrong, is that how people were planning to evacuate? They talked about during the Kuwait project—that if anything went wrong politically or whatever, they would just board the aircraft and leave. That was the evacuation plan.

LeMone: We didn't feel that insecure in Africa at the time. The only people who got into political difficulties were the Russians [when they] went down to Guinea-Bissau to get something done to the airplanes, and they were put under house arrest. But other than that, we never, I don't remember having any political problems when we were there. Not fun to have to worry about.

Archives: You didn't have any political problems personally, but were there a lot of civil issues going on, or was it fairly peaceful?

LeMone: At that time, Senegal was fairly peaceful. The big problem was the pressure created by the drought in the Sahel, and there were a lot of refugees on the streets in Dakar. One thing that was really sad, and some of the people in GATE took advantage of, was that some of these people were selling things that had been in the family, [in order to] survive. You know, these were proud people; they didn't want to accept things, so that the streets of Dakar were full of people. As far as political unrest, if it was there, I wasn't conscious of it. You know, we'd wander around Dakar and felt reasonably safe.

Archives: As a woman, you didn't worry about--?

LeMone: I did, a little bit because there were all these guys proposing marriage. I think it was kind of a little *sh tick* they had for dealing with Europeans; we were all Europeans, all Whites are Europeans in Africa. That got a bit old after awhile. There were certain parts of town you didn't go by yourself.

Archives: Was Senegal already free of France by that time?

LeMone: Yes, they had been for some years. I don't know how they're doing now. I think they're still one of the more stable republics in Africa.

Archives: Wrapping up on the Electra: all the times that you've flown on the plane, were there safety lectures, like flight attendants give at the beginning of a flight, if you went down over the Atlantic, did you have a seat cushion that you could use as a float?

LeMone: I think there was some briefing on that, and I remember in TOGA-COARE, it was kind of understood that you were expected to keep your seatbelts fastened at certain times. I remember as scientist in charge of the Electra during one particular period when some people got aboard the aircraft and were just wandering around when we were going through some pretty significant turbulence, the pilot called me up to the cockpit and said, "Could you talk to those people, and tell them they're not supposed to wander around the airplane when there's turbulence?" I would say that NCAR, while safety is certainly in mind, they're not as strict as NOAA where they have a real protocol you have to go through. Of course that's for the hurricane flights, that might be a slightly different situation. But there is a certain amount of briefing that's done with people, particularly if they're new, and so I do think they do that. But if you've been on the plane every day for ten days, they don't keep giving you the same lecture, like on a commercial airliner I could almost recite the mantra.

Archives: And so many people fly today that there's no difference from plane to plane.

I think we can wrap up now. Did you have any other questions or comments? What we're planning to do is have our student do the transcription and then we'll send it back to you. Then you can edit at will.

LeMone: I'm going to bring you my book full of pictures...I also have diaries that I kept. I kept diaries for 30 years. I kept one on Dakar.

Archives: You did one on every project you went on...?

LeMone: Yes, just all the time. I just keep them.

Archives: When do you find time for that? Do you sit down at a specific time each day?

LeMone: Yes, kind of toward the end of the day. And what I did in Dakar, since I was basically—instead of writing separately in my diary—I'd write a letter to somebody. Remember carbon paper?

Archives: Yes!

LeMone: I'd use carbon paper, and my diary in GATE was carbon paper letters to people. I figured why write it twice?

Archives: And you'd always have the copy of your letter; they'd probably be writing back.

-END OF INTERVIEW-