NATIONAL TRANSPORTATION SAFETY BOARD

Washington, D.C.

In the Matter of:	:	
THE INVESTIGATION OF THE USAIR, INC., FLIGHT 427, A BOEING 737-300, N513AU,	:	DOCKET NO. SA-510
ALIQUIPPA, PENNSYLVANIA, SEPTEMBER 8, 1994	:	

Pittsburgh Hilton and Towers Hotel
Pittsburgh, Pennsylvania

Friday, January 27, 1995

The above-entitled matter came on for hearing pursuant to notice, before JIM HALL, Chairman, at the Pittsburgh Hilton and Towers Hotel, 600 Commonwealth Place, Pittsburgh, Pennsylvania, on Friday, January 27, 1995, at 8:40 a.m., before:

Board of Inquiry

JIM HALL, Member, NTSB
Chairman

William G. Laynor, Deputy Director of
the Office of Aviation Safety

Ronald L. Schleede, Chief,
Major Investigations Division, Hearing Officer

John Clark, Chief, Vehicle Performance Division
Office of Research and Engineering

Michael L. Marx, Chief, Materials Laboratory
Division, Office of Research and Engineering

Technical Panel:

Thomas E. Haueter, Investigator-in-Charge,
Hearing Officer

Gregory Phillips, Senior Systems Investigator

Charles Leonard, Operations Investigator

Thomas Jacky, Vehicle Performance Investigator

Cynthia Keegan, Structures Investigator

Roff Sasser, Systems Investigator

Nora Marshall, Senior Survival Factors
Investigator

Staff:

Michael Benson, Office of Public Affairs

Jamie Finch, Special Assistant

Robert Francis, Board Member

Kenneth Jordan, Managing Director

Peter Goelz, Director of Congressional
and Intergovernmental Relations

Julie Beal, Director of Public Affairs Office

Shelly Hazle, Confidential Assistant

Carolyn Dargan, Administrative Assistant

Shirley Wright, Administrative Assistant

National Transportation Safety Board
National Safety Transportation Board
490 L'Enfant Plaza, SW
Washington, D.C. 20594

General Counsel:

Daniel Campbell, Director
Office of General Counsel, Washington, D.C.

Parties to the Hearing

Department of Transportation,
Federal Aviation Administration
Harold Donner
AAI-100
800 Independence Avenue, SW
Washington, D.C. 20591

USAir, Inc.
Captain Gene Sharp
115 Commerce Drive
RIDC Parkridge 2
Pittsburgh, Pennsylvania 15275

Air Line Pilots Association
Captain Herb LeGrow
535 Herndon Parkway
Herndon, Virginia 22070

Boeing Commercial Airplane Group
John Parvis
7342 East Marginal Way, South
Building 3-800.3, Bay A2
Seattle, Washington 98108

Monsanto Company
Frank Jakse
800 N. Lindbergh Boulevard
St. Louis, Missouri 63167

Parker Hannifin Corporation
Steve Weik
14300 Alton Parkway
Irvine, California 92718-1814

International Association of
Machinists and Aerospace Workers
Jack Wurzel
73 Auburn Street
Saugus, Massachusetts 01906

C O N T E N T S

I N D E X

P R O C E E D I N G S

(Time Noted: 8:40 a.m.)

CHAIRMAN HALL: If the parties and interested observers could take their seats, we will begin the hearing.

We will begin the fifth day of our hearing on the cause of U.S. investigation into the crash of USAir Flight 427. Our first witness this morning is Captain William Traub. He is a Vice President for Flight Standards and Training for United Airlines in Denver Colorado.

Captain, if you would please come forward.

(Witness testimony continues on the next page.)

CAPTAIN WILLIAM TRAUB, VICE PRESIDENT FOR FLIGHT STANDARDS AND TRAINING, UNITED AIRLINES, DENVER, COLORADO

Whereupon,

WILLIAM TRAUB,

was called as a witness by and on behalf of NTSB, and, after having been duly sworn, was examined and testified on his oath as follows:

CHAIRMAN HALL: Captain, welcome. Before Mr. Schleede begins, let me explain to the parties and to the interested observers that Captain Traub is here at the request of this Board and this Chairman to discuss the latest training procedures that United is undertaking in regard to an area called, I believe, advanced maneuvers.

His testimony today is specifically in that regard. Any questioning for Captain Traub, I would appreciate would be limited to that training and that procedure. The Chairman will rule out of order any questions that would pertain to that training and the investigation of the accident involving Flight 427.

Mr. Schleede, you may begin.

Mr. Schleede's microphone please, or the microphone to my left.

MR. SCHLEEDE: Hello, hello. Okay.

Captain Traub, please give us your full name and business address for our record.

THE WITNESS: William H. Traub. My business address is the Stapleton Airport, Denver, Colorado.

MR. SCHLEEDE: And you are employed by United Airlines?

THE WITNESS: By United Airlines, yes.

MR. SCHLEEDE: In what position?

THE WITNESS: My current position is Vice President, Flight Standards and Training.

MR. SCHLEEDE: Could you give us a brief description of your background and education that qualifies you for your current position?

THE WITNESS: I graduated from Brown University, entered the United States Air Force after graduation.

CHAIRMAN HALL: Let's, if you wouldn't mind holding there.

Can we get the hum out of the mike here? Let's give them a minute.

(Pause.)

CHAIRMAN HALL: All right. Please proceed.

THE WITNESS: After graduation from college, I entered the Air Force, spent five years in the United

States Air Force. Joined United Airlines after that. Continued in the Air Force Reserves for another 17 years.

I have been involved in training pilots at United Airlines for about 28 of my 31 years. Is that enough?

MR. SCHLEEDE: What FAA ratings and certificates do you hold?

THE WITNESS: I have flown all of United's airplanes. I am type rated in the 737, all models; the 727; the 747, all models of the 747; most of the Douglas airplanes. That's general.

MR. SCHLEEDE: Approximately how much total flying time do you have?

THE WITNESS: Flight time, approximately 15,000 hours.

MR. SCHLEEDE: And about how much time do you have in the 737?

THE WITNESS: In the 737, probably several thousand hours.

MR. SCHLEEDE: Okay. Thank you. Mr. Leonard will proceed.

MR. LEONARD: Good morning, Captain Traub. Thank you for coming.

Would you please refer to Exhibit 2-B, an

addendum to the Operations Group report, pages 7 through 31.

THE WITNESS: Yes, I have that.

MR. LEONARD: All right. Could you tell me in reference to that document, why did United Airlines develop this program?

THE WITNESS: About two years ago, I became interested in seeing what additional things we could do in using our advanced simulators to explore what I would consider more edge of the envelope type flying with transport type airplanes.

I feel that training directors like myself, we need to be proactive and provide dynamic training for our pilots. And I just felt at that time that perhaps we were not taking full advantage of the capability of our simulators.

I had undertaken a simulator project about 15 years ago in the area of wind shear and the program that resulted from that training has been very successful, both at United Airlines and within the industry. And I thought that perhaps by doing some things in the, what I consider the advanced maneuvers area, that we could provide a similar impact in training and perhaps bring pilot training to a new level of sophistication and capability.

MR. LEONARD: I recognize that the program is still in the developmental stages and that what we have really is a draft of that program and not the final product, but would you please describe some of the maneuvers that are presented currently in your program?

THE WITNESS: The maneuvers in the program are tailored to the particular airplane type, but I would say the core maneuvers that will be implemented in all fleet types would be a handling of a transport airplane in a low energy situation with an engine failure, such as a pilot might experience on a missed approach or shortly after takeoff.

Another core maneuver would be a high angled attack, low air speed situation. Another core maneuver would be a high bank and a very nose low maneuver. I think that would apply to all fleet types and then there would a number of specific maneuvers tailored to the particular fleet.

MR. LEONARD: In these maneuvers, would it be safe to say or characterize them as well outside what normal training is accomplished in a flight crew training program?

THE WITNESS: I would say, sir, that heretofore we did not do some of those maneuvers to the degree that we are doing them now. I think there was

some amount of exposure to certain parts of those maneuvers that have traditionally been in the training program, but we had not concentrated on the details of each of those maneuvers, and some others, up until about a year ago, or a little short of a year ago, when we actually implemented this training.

MR. LEONARD: In what aircraft or simulators has this program been implemented to this point?

THE WITNESS: It has been implemented in the 757, 767 training program, and it has been implemented in the 737 300-500 training program.

MR. LEONARD: And your plans for the future?

THE WITNESS: My goal is to have it implemented in all fleets by the end of the first quarter of this year.

MR. LEONARD: About how many pilots have received this training so far?

THE WITNESS: Approximately 300 pilots.

MR. LEONARD: And what has been the reaction by the flight crews so far?

THE WITNESS: The flight crews' reaction to this training has been universally enthusiastic. They have adapted very well to the training and have been very appreciative of what they have learned as a result of going through this package.

MR. LEONARD: In your training, Captain Traub, how much additional time has been required, could you estimate, to implement this program in training?

THE WITNESS: We have estimated in the transition program about two additional hours of simulator time per pilot. In the recurrent training program, about 30 minutes per pilot.

MR. LEONARD: Now, the package includes at this point I think some 13 maneuvers, or something like that. I am sure that is going to vary. How would that be implemented in, say, an initial training of a flight crew member, where they normally have, say, six simulator rides or something along those lines?

THE WITNESS: What we have found to be most useful up to this point is early in the training, in this case the 757, 767, introducing the pilot in the early simulator periods to several of these maneuvers each transition training period. So by period 3 or 4, the whole package has been introduced to the pilot.

MR. LEONARD: Now, are these geared towards a proficiency level or towards a demonstration type of activity?

THE WITNESS: Well, it starts out as a demonstration but we do require proficiency on the

maneuvers.

MR. LEONARD: Have there been any surprises so far in the training? Your instructors been surprised at any of the results so far?

THE WITNESS: I don't think that we have had any great surprises. I know I have personally been through the training on both of the airplanes that we have it implemented, and I would have to say that I have learned some things that I had either forgotten or perhaps never knew about the handling of transport airplanes. I am more confident in the airplane and more confident in my own abilities as a result of going through that training.

MR. LEONARD: So it enhances the self-confidence of the flight crew member in his performance of flying the aircraft and his general capabilities?

THE WITNESS: That is correct. And I guess I would also say I was a little bit surprised at the enthusiasm of the pilots for this type of training.

MR. LEONARD: And you brought up the, at this point in time, the program that you have for recurrent training, and how has that been working so far and what type of maneuvers or what blend of maneuvers are entered into the training there, recurrent training?

THE WITNESS: In the 737 300-500 fleet, we

are under a training concept called CQP, or Continuing Qualification Program. That is a new training concept permitted by the FARs, and that training program allows us some additional time in the simulator to accomplish these maneuvers. So it was very easy to implement into that training program. And by doing it in the recurrent program, we will expose that training package to the entire fleet within 12 months.

MR. LEONARD: How have the simulators responded thus far, Captain Traub, to the program?

THE WITNESS: The simulators have responded very, very well. When we got into the investigation, we were not quite sure how they would respond, but we found aerodynamically they have operated very well. We have only dealt with our advanced simulators, the most, or the latest state of the art simulators that we have.

I can't say how some of the older simulators are going to act. We have had no difficulty with the mechanical reliability of the simulators. And what is most beneficial in the advanced simulators is the ability to line select certain maneuvers, so that there is nothing artificial about the implementation or putting the pilot into this particular maneuver.

MR. LEONARD: For a moment would you please refer to Exhibit 2-R, Captain Traub.

THE WITNESS: Yes, I have that.

MR. LEONARD: Has there been anything from that publication, or that type of publication, that you have used in the development of this program?

THE WITNESS: No.

MR. LEONARD: Have there been any specific problems that you have noted in the implementation of this program in the air crew performance? Let's touch on such things as crews that fly highly automated aircraft. Have you noticed anything in that area as concern your training instructors?

THE WITNESS: I can't think of anything that has concerned us, other than certain airplanes, or perhaps some of the newer airplanes have characteristics that pilots need to be familiar with.

MR. LEONARD: You are going to be receiving the 777 before long. Have you given any thought to how you are going to implement it in that airplane?

THE WITNESS: Yes, we have already developed a package for the 777. We have a simulator that is operating at this time, and it works very well on the 777. Both the airbus and the 777 do have some characteristics that we need to deal with. There is bank limiting protection and there is stall protection that is built into the airplane, so we need to deal

with that. And the pilots need to be familiar with how the airplane responds as you approach those regimes of flight.

MR. LEONARD: As you have developed this program, how has it been handled by the FAA in terms of approving the program or that type of thing?

THE WITNESS: We have not asked the FAA for approval. I have had the FAA in to fly the program and they have been very enthusiastic to the results of the program.

MR. LEONARD: Is there anything else you would like to share with us, Captain Traub, relative to your feelings on this program and what United has learned thus far?

THE WITNESS: My recommendation to the FAA in this regard, if they were to suggest that airlines in the United States adopt this training, that they establish a training objective and then allow the individual airlines to develop the program that accomplishes that objective and not specify a particular amount of time in a simulator or even specify the maneuvers, because these will vary by airplane type and the type training program that the advanced maneuvers are implemented in.

So I think it is very important that the

government agencies, if they choose to do so, if they choose to make this type training mandatory, that they merely establish the training objective and then let the experts develop a program that meets those objectives, and then the FAA can be the final proving authority of that program.

MR. LEONARD: I want to thank you very much, Captain Traub, for sharing these thoughts with us on this program. I appreciate it very much and I have no more questions for you. Thank you, sir.

THE WITNESS: You are welcome.

CHAIRMAN HALL: What I would like to do this morning is to go around to the individual tables and call on the spokesperson, each spokesperson, and whether you have a question for this witness or not, I would appreciate it if you would identify the people that have been at your table this week.

Everyone has committed a large amount of resources to this investigation and everyone, I know we are missing a few people this morning, but I would like to at least identify for the record those individuals who have been here.

And if I could begin with Mr. Wurzel and the International Association of Machinists. Mr. Wurzel, do you have any questions for this witness, and would

you please identify the individuals at your table?

MR. WURZEL: Good morning, Mr. Hall. We have no questions for the witness.

At our table are Dave Supplee, he is a Flight Safety Committee person from our District 141 of the Machinists union. Mr. Wayne Galimore, he is a Flight Safety Committee coordinator for our District. Mr. Mike Gardner, he is also a coordinator. Mr. Olney Anthony, and Mr. Terry Kleiser.

Thank you very much.

CHAIRMAN HALL: Thank you, and, gentlemen, we appreciate your participation.

Mr. Jakse with Monsanto.

MR. JAKSE: Thank you, Mr. Chairman. We have no questions for this witness.

To my left is Carl Moskowitz of Public Relations. Jim Siegel, Business Manager for the Skide Roll product. David Snively, Counsel. And John Cowden, Counsel.

CHAIRMAN HALL: Thank you very much.

MR. JAKSE: Thank you.

CHAIRMAN HALL: Mr. Purvis with the Boeing Commercial Airplane Group.

MR. PURVIS: Thank you. We have no questions for Captain Traub.

Across from me is Jean McGrew who has shared the co-spokesperson duties with me during the week, and also testified. Next to him is Rick Howes who was the Boeing coordinator on the actual accident field phase of the investigation, and has done a lot of work in the preparation for this hearing.

On my left is Bruce Campbell and next to him is Tom McLaughlin. Both of them are Counsel with the Perkins-Gouhey outside firm for us.

David Hyde, who is going to testify shortly, a captain with Boeing. And -- oh, I am sorry, I got David, it is Mr. Tom McLaughlin is in the corner. Sorry, it is David Hyde in between them. And I have got Paul Cline and Bernie Turner who have previously testified and have been helping us.

CHAIRMAN HALL: Thank you very much. We appreciate your assistance.

Mr. Weik, Parker Hannifin.

MR. WEIK: Thank you, Mr. Chairman. There's no questions for the witness.

Sitting across from me is Mr. Silane, outside Counsel. Sitting next to him is Steve Vaughn, inside Counsel.

CHAIRMAN HALL: Thank you very much.

Captain LeGrow with the Airline Pilots

Association. Captain.

CAPTAIN LeGROW: Thank you, Mr. Chairman. I do have a couple of questions for Captain Traub, if I may, please?

CHAIRMAN HALL: Sure. Please proceed.

CAPTAIN LeGROW: Good morning, Captain Traub.

THE WITNESS: Good morning.

CAPTAIN LeGROW: Just a couple of issues. Your, the title of Advanced Maneuver Package, which has been referred to, at least in some of these meetings, as Unusual Attitude Recovery Program, when was this implemented to the line pilots?

THE WITNESS: The first official implementation to the line pilots was July of last year.

CAPTAIN LeGROW: And you say there has been 300 pilots have been through this program?

THE WITNESS: Approximately, yes.

CAPTAIN LeGROW: How many of those are 737 pilots, line pilots? I am not referring to instructors but line pilots.

THE WITNESS: It was implemented in the 737 training program the first of this year, and let's say we have about six to eight pilots a day going through that program, so less than a hundred so far in the 737,

line pilots.

CAPTAIN LeGROW: Okay. Thank you. Are you familiar with the British Airways program?

THE WITNESS: No.

CAPTAIN LeGROW: You are not at all familiar with it?

THE WITNESS: No.

CAPTAIN LeGROW: Could you tell me if there are any other domestic airlines that have a similar program?

THE WITNESS: Not to my knowledge.

CAPTAIN LeGROW: During your program when you run pilots through, do you assume recovery of all three axes of the airplanes in your recovery from these maneuvers?

THE WITNESS: We require recovery of the airplane. I don't know exactly what you mean by all three axes.

CAPTAIN LeGROW: Exactly that. You don't fail the R axis, or the roll axis or the pitch axis in any of these maneuvers?

THE WITNESS: No, we don't implement any failures in the airplane.

CAPTAIN LeGROW: Thank you. I have no further questions, Mr. Chairman.

CHAIRMAN HALL: If you could introduce your table, please.

CAPTAIN LeGROW: Certainly, I would be glad to. I have Captain John Brookman who worked on the Operations Group. Mr. Conny Kleissas, First Officer Conny Kleissas who worked at the Structures Group. I have Captain Bob Tully who was the Chief Accident Investigator for ALBER at USAir. Captain John Cox, who worked in the Systems Group with us. And Mr. Keakini Kaulia, who is with our staff down in Washington.

CHAIRMAN HALL: You did better with Mr. Kaulia's name than I did the first time.

CAPTAIN LeGROW: He spelled it out for me here, Mr. Chairman.

CHAIRMAN HALL: All right. Captain Sharp.

CAPTAIN SHARP: Good morning, Mr. Chairman, Mr. Traub. We have no questions of this witness.

At our table, to my right, going around the table is Mark Dombroff of Dombroff and Gilmore in Washington, outside Counsel. General Bob Oaks who is the Vice President of Corporate Safety and Regulatory Compliance for USAir. Captain George Snyder is the Director of Flight Safety and Quality Assurance.

Mr. Bill Petrogallo is local Counsel, outside Counsel. Dane Jacques, with the firm of Gilmore,

Dombroff and Gilmore, and Captain John Murphy who is USAir's Senior Director of Flight Operations.

CHAIRMAN HALL: Thank you very much, gentlemen, for your participation.

Mr. Donner, FAA.

MR. DONNER: Yes, sir. Thank you. I do have a question, but first I would like to introduce Mark Tomicich from our Chief Counsel's office; Victoria Anderson and Larry Smith, who were the co-FAA representatives at your investigation and investigators in my office.

Captain Traub, thank you for your presentation. It was very interesting, and I did hear your message to the FAA. I will carry it back home.

A question on your comments on the simulator reliability. Did you have to do any reprogramming to extend the edges of the envelope, so to speak?

THE WITNESS: I know our engineering people did some work on the simulators. I can't really testify to the extent of that work. We, on the team that we had to put this together, we had two aero-engineers from our simulator department.

MR. DONNER: Are you confident that the sensations that the pilots are feeling are realistic when you get into some of the higher G maneuvers?

THE WITNESS: Well, as you know, in a simulator, we can only simulate about six-tenths of a G. So the one thing that is missing in the experience is the actual G forces.

What we have done to try to address that, and it is not a total solution, but we have, we use the DME indicator to read out actual G forces on the air frame. And if the recovery should exceed any of the limits in G forces, it actually sounds a chime in the back of the simulator. So the pilots do get some feedback on the actual G force on the airplane.

MR. DONNER: Thank you very much.

CHAIRMAN HALL: Thank you very much, gentlemen.

Mr. Marx.

MR. MARX: No questions.

CHAIRMAN HALL: Mr. Clark?

MR. CLARK: I have no questions.

CHAIRMAN HALL: Mr. Schleede?

MR. SCHLEEDE: Yes, Captain Traub, just a couple of areas here. A follow-up to Mr. Donner's questions. You said you weren't' aware of what the engineers did, but I did want to ask you for the record, do you know what kind of cost was involved in getting this program going?

THE WITNESS: No exactly. The manpower cost was, I would say somewhat significant, but I don't know of any hardware cost.

MR. SCHLEEDE: Okay. And you mentioned that the 777 and the A-320 had some unique characteristics that you had to overcome. Do you actually have to modify the flight envelope to be able to do these maneuvers? Do you pull circuit breakers to get the airplane -- I know it has limitations on banking.

THE WITNESS: No, we don't have to pull circuit breakers or modify the flight envelope. But we have to use the simulator computer to, as I say, line select a high bank situation or a full stall. The flight controls cannot implement that type of a maneuver.

MR. SCHLEEDE: Okay. Do you know, in developing this program, was there any involvement of the manufacturer, Boeing, or the airframe manufacturers in setting up the program?

THE WITNESS: We talked to the Boeing company with respect to the data package that is used for the simulator, but that is a regular, ongoing process anyway. So other than that, I don't know of any contact with the manufacturer.

MR. SCHLEEDE: I was just curious if there

was, in developing the program, if you looked at historical records and data involving incidents or events to develop the maneuvers?

THE WITNESS: Oh, absolutely. That's what peaked my interest in trying to do something proactively in this area and I had the NTSB reports from accidents that have happened over the last ten or more years, and various other government agency reports, but I think mostly the NTSB reports.

I remember specifically the accident over the Pacific around Shimia, where I think it was a MD-11 had some flight control anomalies that ended up in somewhat of an upset and the great damage and loss of life associated with the recovery from that maneuver. That's what really peaked my interest in trying to do more in this particular area.

And over the years there has been similar accidents, not necessarily high altitude upsets but areas where perhaps the controls were not handled properly, and we ended up with maybe a damaged airplane or something more serious.

MR. SCHLEEDE: I appreciate, that was my last question, if you use NTSB reports or safety recommendations in your development of your program.

THE WITNESS: Absolutely.

MR. SCHLEEDE: Thank you very much.

CHAIRMAN HALL: Mr. Laynor.

MR. LAYNOR: Captain Traub, have you observed much of the training firsthand, the pilots going through the program?

THE WITNESS: No. I have gone through the training myself, but I have not been in the simulator and observed the pilot training.

MR. LAYNOR: I was wondering feedback from your instructors, whether you could characterize the general pilot performance, when they come into the program and after they receive a little bit of the training.

THE WITNESS: I have talked to a number of instructors and check airmen who have conducted the training and they have reported the enthusiasm of the pilots and they have not encountered any difficulty in training or exposing these particular maneuvers.

MR. LAYNOR: Well, what I was trying to get to, is there a significant change in the pilot's ability to cope with the problems that they are given during it?

THE WITNESS: I don't think so. The pilots, as I testified before, their confidence level in their airplane has improved, and they have seen some things

that they had not been exposed to before.

MR. LAYNOR: How about their ability to recover from these problem areas?

THE WITNESS: Well, once the techniques of recovery have been pointed out, they have had no difficulty in recovering.

MR. LAYNOR: Are these six degree of freedom simulators, or three degree of freedom?

THE WITNESS: No, they are all six degree.

MR. LAYNOR: All six degree.

I have no more questions. Thank you, sir.

CAPTAIN HALL: Captain, I greatly appreciate you taking time from what I know is a very busy schedule to be here this morning and to present us information on this program. We appreciate your attendance and you are excused.

THE WITNESS: Thank you very much.

(Witness excused.)

CHAIRMAN HALL: Our next witness is General Robert Oaks, a Vice President for Corporate Safety and Regulatory Compliance with USAir here in Pittsburgh.

General Oaks.

(Witness testimony continues on the next page.)

GENERAL ROBERT OAKS, VICE PRESIDENT FOR CORPORATE SAFETY AND REGULATORY COMPLIANCE, USAIR, PITTSBURGH, PENNSYLVANIA

Whereupon,

ROBERT OAKS,

was called as a witness by and on behalf of NTSB, and, after having been duly sworn, was examined and testified on his oath as follows:

CHAIRMAN HALL: Welcome, General. Mr. Schleede will begin the questioning.

MR. SCHLEEDE: General Oaks, give us your full name and business address for the record, please.

THE WITNESS: Yes. Robert Charles Oaks. Business address, Pittsburgh Airport, USAir.

MR. SCHLEEDE: And would you give us a brief description of your education and background that brings you to your present position?

THE WITNESS: Certainly. I started in the aviation business in 1954 when I enlisted in the Utah National Guard as an Aviation Specialist. Graduated from the Air Force Academy in 1959 with a Bachelor of Military Science and as a rated navigator. Entered undergraduate pilot training, Air Force Flying School in 1960 -- or 1959, graduated in '60. Entered fighter

training.

For the next six years I flew fighters, F-100's, around the U.S. and had a tour in Japan, and also a tour in Vietnam. Compiled 300 hours of combat time at that time. Came back, got a Master's degree at Ohio State. Flew the C-47 at that time. Went to the Air Force Academy as an instructor pilot in the T-41 and as the Exec. for Honor and Ethics at the Academy.

Went from there back into fighters as a F-111 pilot, Flight Commander, Squadron Operations Officer, and Squadron Commander. Then compiled about 600 hours in the F-111 and then went to Naval War College. Several staff tours, staff jobs in the Pentagon. Went to Europe, ended up as the Commander of a fighter wing flying F-4's at that time.

Back to the Pentagon in Personnel, and then back to Europe as the Commander of Allied Air Forces, Southern Europe, NATO Commander responsible for NATO Air Operations in Italy, Greece, Turkey and the Mediterranean.

Came back then to Air Training Command. We had over a thousand airplanes in Air Training Command. Flew about 25 percent of the U.S. Air Force's flying time in the command. And then back to Europe as the Commander of United States Air Forces in Europe and

Commander of Allied NATO Air Forces in the Central Region.

In that job we provided about 40 percent of the support in the Gulf War, fighter support, U.S. Air Force, and also responsible for all Air Operations in Bosnia and then, and the downsizing.

And have compiled, have about 4500 hours of flying time, mostly fighter, but also have flown the T-43, which is the Boeing 737 equivalent and for over a hundred hours have flown Gulf Stream and LearJet extensively. Have flown also the C-5 141, KC-135, the B-1 and the B-52.

MR. SCHLEEDE: And how long have you held your present position, sir?

THE WITNESS: I have been in this job since December 1st. I might mention, because I think it is important to the matter at hand, in those jobs I had, I started out as a Squadron Flying Safety Officer. My safety experience, Squadron Flying Safety Officer, Board, Accident Board Investigation Member. Conducted my own investigation as a Squadron Commander of an accident that we had. And, of course, as the senior, as the Commander in those various organizations, really the head Flying Safety Officer responsible for safe flight operations and the investigation of all

accidents.

MR. SCHLEEDE: Have you attended any formal training for safety schools, accident investigation or safety schools?

THE WITNESS: I have not.

MR. SCHLEEDE: Thank you. Mr. Leonard will proceed.

MR. LEONARD: Good morning, General. Can you hear me all right, sir?

THE WITNESS: Yes, I can. Thank you, Mr. Leonard.

MR. LEONARD: To whom do you report, sir?

THE WITNESS: I report directly to the CEO of USAir, Mr. Seth Schofield.

MR. LEONARD: Could you explain to us how your office is organized?

THE WITNESS: Yes. We have brought, we have consolidated in USAir in the last two months, all safety operations. So we have brought the ground safety operation and the flying safety operation that previously existed under flight operations. We have brought them into one consolidated office. And so we are responsible for all aspects of corporate safety as well as for regulatory compliance. And reporting, as I said earlier, directly to the CEO.

MR. LEONARD: Could you describe some of the qualifications of the people in your staff in the aviation, specifically in the flight safety end of it?

THE WITNESS: Well, yes. They have been, they have all been to accident investigation, they have been to accident prevention courses. Been to the USC course in accident prevention and investigation, and they have been to ALPA investigation, accident investigation courses, FAA accident investigation courses and seminars, plus they are all qualified on various aircraft within the company.

They are all captains flying aircraft, current in the aircraft. So they are highly qualified both in the atmosphere and the culture of aviation as well as the specifics of accident investigation and prevention.

MR. LEONARD: In 1994 USAir had two major accidents. Could you describe for us what changes USAir safety department has implemented since those, as a result of those accidents?

THE WITNESS: Well, I would like to emphasize that USAir has had a long ongoing safety program since its inception, and the things that we do, the safety programs, are not in response to any particular accident.

However, in this, under the focus that USAir has found itself following those accidents, we have made some significant changes. As mentioned, we have consolidated all aspects of safety under one office reporting directly to Mr. Schofield. And that gives safety a great deal of visibility within the corporation. It has always had some visibility because of the campaigns conducted and the various activities. But it gives a greater visibility and lets us reach out maybe in a little more effective way to the people within USAir.

We have just published our second issue of a safety magazine, a corporate safety magazine, that lets us communicate more directly, and we expect more effectively, to the people in the organization about safety programs, safety problems, a cross-tell of information of other people's experience in safety matters.

We have instituted a flow of information program, improved flow of information, where we are encouraging people to be, I would say even eager to give us data that we can react to, safety data that they might not have felt we were adequately reacting to the in the past. And so we want to improve that flow of safety information from the bottom as well as from

the top. We promised them feedback and we will provide that feedback on what we do, how we react to the information that they flow. So I think there is an improved flow of information system.

We have improved focus on ground safety. We believe that it is a culture and that you can't separate flight safety from ground safety, so we are focusing on aspects of ground safety. For example, we have got a campaign, we have started a campaign to pay attention to, greater attention, and bring everybody's attention to aircraft accidents on the ground. Things that normally aren't, that aren't serious enough to make the news, but we think there is an area there for improving our safety culture within USAir.

We have also, and this is in fact in direct response to the accidents and the publicity, is we have initiated, and in fact are now just winding up, an outside audit, PRC, Planning Resource Corporation.

Mr. Dixon Speece and his folks have been spending a lot of time with USAir, all aspects, doing an in-depth safety audit, to make sure that we in our internal audit system, and in our internal assessment, had not overlooked some significant safety problem area. And so we have brought them in with a highly experienced group of auditors and we are just winding

that up. So we have, and in the safety department we have given full support and been deeply involved in that audit that is now concluding.

MR. LEONARD: Can you share with us any of the results of that, sir, or is that still pending?

THE WITNESS: Well, as I said, they are just concluding. The report is not yet in our hands. But I would hasten to add that, as you would expect, every day we were asking them, have you found anything significant that we ought to be about? And I am happy to report that, no, they found no significant safety items that, safety malpractices within USAir. And so we felt confident before, but we have now got outside verification of our basic safety culture.

MR. LEONARD: General Oaks, would you refer to Exhibit 2-N, please, which is the Advisory Circular published by the Federal Aviation Administration, 120-59.

THE WITNESS: Okay, I am familiar with that circular.

MR. LEONARD: "Air Carrier Internal Evaluation." Could you comment on that, sir, as far as what USAir's response to that Advisory Circular is?

THE WITNESS: On the internal audit?

MR. LEONARD: What, sir?

THE WITNESS: The --

MR. LEONARD: On the Advisory Circular 120-59, "Air Carrier Internal Evaluation Program."

THE WITNESS: Yes.

MR. LEONARD: Could you comment on that?

THE WITNESS: We have instituted that program and we have an internal audit. As I mentioned, the flight safety department that was previously under flight operations is in fact an internal audit system conducting audits really in full response to that voluntary circular, the voluntary suggestions, but we have implemented that circular recommendations and provide reports according.

MR. LEONARD: And part of that circular, part of that process recommended in that Advisory Circular recommends upper management monitoring of it. Could you comment at all as to how that part of it is implemented with USAir?

THE WITNESS: Well, yes. As I said, we -- that's my job, of course, as the safety, Vice President for Safety and Regulatory Compliance, and to bring that to attention and report to the senior leadership.

And one other item you asked what we had done, we have instituted a safety meeting at the corporate level so that all the senior officers in

USAir will receive a direct report from me monthly in a safety meeting, and of course that report, that audit report, internal audit report that you mentioned in response to that circular, will be a part of that presentation.

MR. LEONARD: Thank you, General. Would you refer to Exhibit 2-O, please, sir. That's another Advisory Circular.

THE WITNESS: I have got them shuffled pretty well here.

MR. LEONARD: All right. Take your time.

THE WITNESS: Okay.

MR. LEONARD: Its "Air Carrier Voluntary Disclosure Reporting Procedures." Could you comment on USAir's involvement or response to that Advisory Circular?

THE WITNESS: Yes. Again, we have been fully supportive of that. In fact, we have taken it one step further and we are at this time, part of that information flow system that I mentioned, we are providing a similar kind of program to USAir employees, that we provide them immunity from punishment for information that they provide even involving their own actions involving safety.

If they report it and we don't, then we will,

we promise them immunity to encourage that flow of information. So we are fully supportive of this circular and the basic principles involved in it, that you can't get safer if you don't have that free flow of information with people being free from fear of reprisal and discipline.

MR. LEONARD: Are you aware, General, of any specific actions or results of air flight crews and voluntarily disclosing a problem or an issue and that being discussed with the local FAA office? Do you have any knowledge of any of that, sir?

THE WITNESS: No, I'm sorry, I don't have any knowledge of a specific instance where that has, the circular has resulted in that kind of action.

Let me go back, I won't plead ignorance because of short time on the company often, but I will on that. I would not be surprised if they are there, but I am not aware of any of those instances.

MR. LEONARD: All right. General, I wanted to ask you your opinion, based upon your extensive flight career in especially some automated aircraft which you have mentioned you flew. How it pertains to pilot's response to this automated flight environment, auto pilots and the highly advanced flight director's systems. In general, what is your response to this

issue about automation?

THE WITNESS: Well, automation is at least a two-edged sword, and the first and most important thing to say is automation is very good in improving flight safety and general performance of crews and aircraft in the air, and it is good because it lets the crew handle, receive and handle more information.

It lets the crew back off from some of the tasks that have previously been manually done, and demanded a lot of time to manually do them, so that they can focus on more critical phases of flight, and focus all of their attention on those critical phases of flight at a particular time.

So automation is very good in improving and expanding the capabilities of the crew. That's the good side, and we could talk both in combat aircraft and talk about in commercial aircraft, instances where that is true.

It is a whole lot easier to fly an ILS approach today with the displays and the automated, the more automated displays and coupling with the flight control system that are available today, than it used to be when you were tuning in ADF approach and worrying about the, did you have the right signal all the way down and did you still have the strong signal.

Dramatically easier.

Now, the disadvantage that you always have to worry about is that you make it easy and you make it too easy and complacency builds in. So that is a constant challenge to aviation leadership today, to make sure that in this improved capability atmosphere that automation has promoted, that you in fact don't let complacency come in, and people in fact overlook those basic tasks that are still in their lap.

But I think we have found ways to combat that, and I think we are very effective in general in aviation of battling that complacency.

MR. LEONARD: Thank you. Could you describe, General, the relationship with your office with the local Federal Aviation Administration?

THE WITNESS: Well, I have been very impressed at the quality of that relationship. I think everybody involved, all parties involved, first, the flying public, the taxpayer, the people within the company within USAir, are all well served by that relationship.

Specifically, I would characterize it in a couple of words as cooperative but independent. The flying public and the taxpayer should be pleased at the independence knowing that they have a view into USAir

and all other company operations, an objective view and a realistic view. They get to look at maintenance, they inspect the quality of maintenance. They look at flight operations. They have inspectors on a significant number of flights.

So the USAir -- or the FAA office that supports USA -- USAir, and I am sure every other flying operation has a great feel for the nature of those flight and maintenance operations. So it is objective and it provides that.

It also is a great asset to the company itself, because we get that additional view. It is, I guess if I were to characterize it cynically, it is a free audit. And we get somebody else to look us with the objectivity of an outsider, to say you all are good or you all are bad, you need to improve in this area. And we get several comments of areas for improvement, and we respond to those comments. So I think it is, I would characterize it as very beneficial to all parties involved.

MR. LEONARD: Thank you, General. Just before you, there was testimony by Captain Traub in relation to the Advanced Maneuver Package, which he spoke of in some detail. What is your impression of that program, General?

THE WITNESS: Well, we have had, Captain Johnson, in fact, who testified earlier, has gone and flown in that program, and we are certainly for any improved training program and we are watching United's experience very closely. They have always been the leader in training in the industry, and so we are watching that experience very closely. In fact, the company has petitioned to the ATA that they should conduct, and we would certainly support, the conduct of an industry-wide study to evaluate the benefits of this kind of expanded training program.

MR. LEONARD: General, would you be willing to share with us anything else that comes to your mind in relation to this accident or the hearings that you have been involved with so far?

THE WITNESS: Well, I would just follow up an earlier question that you had, Mr. Leonard, about what we have found as we have looked at ourselves, and USAir has found a good, solid, safe operation. And then as we look back, and we look all of our 45,000 employees in the eye, we feel a little bit victimized by some of the publicity that has surrounded. The innuendo and insinuations about malpractice, after safety malpractice.

Let me be specific, because I think in a

matter like this it is important to be specific. But there were specific allegations of shortcuts in the maintenance area because of the company financial situation. And so when the PRC auditors came on board, we right up front said we are very concerned about this.

First, we are concerned is there any truth to it. And so we asked them to, throughout their audits, at every turn, in the air and on the ground, make sure, look for any case where they saw maintenance shortcuts being taken as a result of -- or for any reason, of course, but certainly as a result of financial condition of the company. And they have not found a single instance in 45,000 employees, not a single instance, where there has been that sort of shortcut that would impair flight safety.

And so we are concerned about the atmosphere and about the insinuations of maintenance malpractice, of safety malpractice on the part of the company. And I think you really could expand, and I guess I would speak for everyone in the aviation business, is that it has not just been a USAir focus, it has expanded to be the U.S. aviation industry, and that is appalling to me as a long term aviator, that the safest way to travel on the face of the Earth, flying U.S. commercial air,

is in fact impugned today with I think reckless and irresponsible accusations.

We can always get better, and the recent safety conference under the FAA direction in Washington highlighted that. We have to be committed to get better. The only reason we are so good is we have had that commitment to get better. So we can never rest on laurels. In the safety business, if you are ever comfortable, it is time to retire. So we will focus that. But we need to remember where we are, and we are in the safest business, transportation business in the world. And this atmosphere of fault-finding and finger-pointing is not conducive to improving that very, very shiny record of accident prevention.

And it didn't always start that way. Aviation isn't inherently safe. It is that way because of a lot of work over many years. We are a hundred times safer than we were forty years ago in commercial flying. That is impressive and it is not an accident that we got there. It is because this kind of approach, this today, and you have heard how thousands and thousands, and it may get to millions of hours spent on this single accident, certainly millions and millions of dollars. And why? -- because everybody involved can't stand to walk away and say

"undetermined."

You just can't do it. All those accidents that I have been a part of in the past, the most gut-wrenching thing is when you say "undetermined." So people are dedicated not by pressure, not by force, but by professional inclination. And I think the American people do not understand what a great national asset they have in the way people working in the aviation industry feel about safety.

And it is not just pilots because their life is in the cockpit; it is the mechanic, everybody on the line. Everybody associated has the same kind of professional atmosphere that you find in the operating room. People think nothing of throwing their body on an operating table and saying, doctor, do me. And the doctor is on the table, all the people around, they are supporting it. But in the aviation business, that pilot and all that crew, they are on the table with you. And I think it is important we get that message to people.

They have a national asset in how mechanics, designers, manufacturers, operators, feel about aviation safety. It isn't loose willy-nilly stuff. It is very professional, very dedicated, and very painful when we go through this kind of grief situation that an

accident brings on families and everybody involved.

MR. LEONARD: Thank you, General. I have no further questions, sir.

CHAIRMAN HALL: Thank you, Mr. Leonard.

Do any of the parties have questions for this witness? Do I see anyone other than USAir?

If not, Captain.

CAPTAIN SHARP: Yes, just one question.

Good morning, General.

THE WITNESS: Good morning, Gene.

CAPTAIN SHARP: General, recognizing the fact that you are not an airline pilot, and you have only been with USAir since December, but considering your extensive experience as a pilot, a safety officer, and the commander responsible for a large segment of the U.S. Air Force, would you comment on a suggestion that the reason the application of ailerons did not or would not counteract any rudder deflection being experienced by Flight 427, is that Captain Germano and First Officer Emmitt didn't apply ailerons in a timely fashion, would you comment on that?

THE WITNESS: Mr. Chairman, you stop me if I get emotional about this. But I -- yes, and I guess irresponsible would be how I would term that accusation. And I will talk you through why I say

that, and I will talk you through in simple terms. I don't want to plea to authority and say, well, from my experience. From your experience, that is absurd.

Because think where they were in the flight. In this crew, they are below 10,000 feet, the sterile cockpit atmosphere prevails, and they are below 10,000 feet. They are turning to their final approach. They are getting, shortly they are going to lower the gear. Their attention is peaked. Now, these are not novices to the business, they have got -- and reading the report, they have got thousands of hours of flying time. Their checks are immaculate, their checks are exemplary. So these are highly qualified, highly professional folks getting ready to land the aircraft. And they are still on auto pilot and the wing drops.

Now, when the wing drops, it drops five degrees and what do you do? You say what's that? And so you are immediate alerted. At the first degree you know something is different. And what is that? And so you are alerted and it goes five and it keeps going, your immediate reaction, as natural as breathing, or as natural as putting one foot before the other when you walk is you put an aileron. You immediate spin that yoke to lift that left aileron up. And at the same time you kick that right rudder because you have got to

bring that up. And those are the two controls that you are taught from the first day you got in an airplane.

So to think that people could sit there for five seconds, responsible, trained, experienced aviators could sit for five seconds and watch that wing drop and say, wow, what it this? and without doing something immediately is unreasonable, in my mind.

So I think we have got to find more -- and it is tough, but that is not going to be one of the answers that we can responsibly light upon.

CAPTAIN SHARP: Thank you, Mr. Chairman, that's all I have.

CHAIRMAN HALL: Captain, before we proceed, I just have one question. Would you agree with the statement that a state of the art flight data recorder would tell us whether the pilots put in the aileron and when they did it, if they did it?

THE WITNESS: State of the art, yes, certainly. There are, there is equipment available that could provide that, and we would love to have that information.

CHAIRMAN HALL: How many 737's do you currently operate, sir, in USAir?

THE WITNESS: About 235 I believe is the right number.

CHAIRMAN HALL: Have you made any recommendations to the president, Mr. Schofield, to upgrade the flight data recorders since the accident of USAir Flight 427?

THE WITNESS: I have not, but as we go back to my, what, fourth point about things we are doing in expanding the flow of information, part of that information system is in fact expanding flight data recorder. We are patterning it about the British Airways system and they have access to that kind of information. We are eager to get that, and so that is in our program. But to answer your question specifically, have I made that recommendation? No, I have not.

CHAIRMAN HALL: Well, General, I want to be respectful because I am very, very impressed with your years of military service to our country, but at the same time I guess the thing that bothers all of us the most here, including all of the parties, be it the airplane manufacturer, the people who have done the rudder, is exactly what the pilots did or did not do, and what the systems did or did not do.

And, again, unfortunately, you mentioned earlier the glare of publicity, whether that publicity is fair or unfair, we have all brought some of that

publicity upon us by being unable to find out exactly what caused the accident of Flight 427. And I think all of us, I hope will leave here with a purpose in mind of being sure that we do not find ourselves in that situation again, particularly in a situation where modern technology can provide us that information.

Mr. Marx.

MR. MARX: I have no questions.

CHAIRMAN HALL: Mr. Clark.

MR. CLARK: No questions.

CHAIRMAN HALL: Mr. Schleede.

MR. SCHLEEDE: Yes. A couple of areas here.

General, in the Air Force, at least when I was there, we had what they call Stand-Eval. programs, Standardization, Evaluation programs. Could you compare the Air Force Stand-Eval. safety programs with what you have seen in your short tenure at USAir as far as the FAA interface, the role it plays, and compare that to your Air Force experience?

THE WITNESS: Yes. We try and accomplish, in standardization in the Air Force, and standardization is done by a particular agency within the flight operations, or within the director of operations office and it is a separate function, different from training. The standardization and evaluation, and it is really

the focus is on evaluation to promote standardization.

As I would characterize it in USAir, why that evaluation process is a function of the training, the check airmen who are in the training department, they do evaluation and they do also training. And, of course, part of that evaluation comes from FAA. They provide that outside the company evaluation.

But I would not like to think that we rely on FAA to provide our standardization evaluation. We certainly have that basic responsibility and conduct our own check flights, our own evaluation system that should lead us to standardization.

MR. MARX: Is the Air Force Stand-Eval. program independent from the training function in the Air Force?

THE WITNESS: Yes, we try and make it independent from the training function.

MR. MARX: Well, help me understand how, if the check airmen and the training is all done in one department, that there is a true separation of Stand-Eval. from the training.

THE WITNESS: Well, I wouldn't characterize it that way in USAir. I characterized it that way in the U.S. Air Force. But it -- so standardization, the check airmen accomplish both training and evaluation.

The independent evaluation would in fact be a function that you would get from both the professionalism of the check airmen themselves and from FAA oversight.

MR. MARX: One other area I would like to cover, which you have discussed some of it. I know you have only been here since December, and you have talked about the program and the organization as it is now. I am interested for you to characterize what you see, believe the corporate culture for safety at USAir was in 1993, 1994, if you can comment on that, prior to your arrival in the reorganization?

THE WITNESS: Well, obviously it is all hearsay information that I have, but that generally doesn't stop me from talking.

CHAIRMAN HALL: I don't know that that is a fair question to ask the General, for him to characterize something when he was not there. If he wants to respond based on, you know, his review or things of that nature, that would be fine. But, General, whatever you want to do with that.

THE WITNESS: Well, I would just repeat what we said earlier, that there were safety activities going on and we have consolidated those in one office, trying to give it some, give it independence under the CEO. But I really couldn't talk about the culture then

versus the culture now.

MR. MARX: Fine. The last area is you mentioned the external audit that was conducted. I don't remember you saying when that was done, what time frame.

THE WITNESS: The PRC audit started about the 20th of November and we expect a report to the company within the next two weeks, so it is very recent.

MR. MARX: Oh, okay. I thought it was in the past.

THE WITNESS: No.

MR. MARX: Okay. Thank you.

CHAIRMAN HALL: Mr. Laynor.

MR. LAYNOR: Just one or two, General. You mentioned the British Airways system in your response to Chairman Hall, and I assume that is the flight operational quality assurance program we have been talking about. This question may have been asked earlier in the hearing, but when does USAir plan to start that program?

THE WITNESS: Well, we have started it. In the basic, we now have the software for analysis of data. So we have brought the British Airways software system, call basis, computer based system to bring it in and give us the capability to analyze data, the

safety information that we get. That improved flow of information that I talked about that is so critical to make that system work.

For example, this year British Air got 5,000 reports, comments, inputs from their employees on safety situations that they have responded to. We need that kind of flow of information from the employees. A part of that system is the flight data, the improved flight data recorder input that they get on a daily basis, they bring that data.

We are engaged in a program with United to outfit, I think it is like 12 airplanes -- maybe it is 20 airplanes, aircraft with that expanded capability flight data recorder with the monies made available. And so we are going to have the capability to get the dramatic improvement, dramatic expansion of flight elements in and do analysis. Of course, that falls far short of our entire fleet and the problems and the challenges of equipping the whole fleet of old aircraft with this kind of capability has been talked about in the past, previously.

MR. LAYNOR: Which fleet of aircraft are they?

THE WITNESS: I believe they are on 757's. Is that correct? They will be on 757's.

MR. LAYNOR: Are these airplanes being outfitted with quick access recorders or are we using the basic flight data recorder information?

THE WITNESS: I can't answer that question. I can look to my table and get you an answer if you would like.

MR. LAYNOR: Well, we'll pursue that later.

THE WITNESS: Okay.

MR. LAYNOR: Have you had full cooperation from the pilots union in the implementation of the program?

THE WITNESS: Yes, we are working with them to make sure that everybody is comfortable with how the information is handled, to make sure that it is handled in a responsible way. We are interested in data and not identity and that is a very important part of it. And that is what, as I understand it, the Airline Pilots Association is legitimately concerned about, is identity and how it is used, and everybody has to be comfortable with that. And that shouldn't be any problem at all in the acquiring and flow and treating of this data.

MR. LAYNOR: All right. Thank you, sir.

CHAIRMAN HALL: General, I just have a few questions. I was wondering if you would share with us

your philosophy of safety.

THE WITNESS: Certainly. Well, as I indicated earlier, it is a total concept that you would hope to get every employee in the organization interested in and feel like they are a safety officer, a safety person in the company. If you don't, you don't have a safety culture. I don't do any safe acts. None of the people on my staff do any safe acts as safety people. Now, they go out and fly and then they operate safely. So you have to develop a system that everybody feels that they have got a part of the action. And that is called a corporate safety culture.

You have to develop concepts and ways to bring that kind of feeling into people at the lowest level in the organization. To do that, you have to not always be reacting to an accident. You have to have a proactive approach. You have to focus on accidents, what caused them, and then you can't just sit and wait for the next one. You have to generalize, learn lessons from and go correct those situations before they can cause you more problems.

And we think in terms of equipment very often in that, but it is attitudes, it is processes, it is training, it is design. It is every aspect of the business. It is how the caterers drive their trucks up

to the aircraft. The whole business associated with that airplane right from first conception through the last flight that it flies.

So you have to think of it in a total sense. But you have to be committed also. And to get that kind of culture, you have to be committed from the top to the bottom. The CEO has to care and has to project that care down to people. And then you have to receive, I think the most core element is a system where information can flow. Better ideas, safety ideas are had at the bottom than at the top. Because they are working with the equipment, the processes, every day. So you have to get that information flowing.

I guess I would say that is about as specific as --

CHAIRMAN HALL: No, I appreciate that. How do you measure safety? How are you going to determine, are there any factors that you would look to or could point us to in terms of measuring safety?

THE WITNESS: Well, there is a real pitfall to measure safety by accidents. And if the number of accidents goes down, then you are safer. But you might be just deluding yourself and you are really just in a bathtub and you are going to come out the other end of it next week. And so I guess I would go back to that

number I stated from British Air. I have got 5,000 employees that took the time to fill out a form and send it in. They all care about safety. To me, that is a great indication of a safety culture, a safety atmosphere, a safety program.

CHAIRMAN HALL: I notice that sometimes the media, in addition to pointing to accidents, points to rule violations and deviations as measures of safety. Do you think that is a fair way to measure safety?

THE WITNESS: Well, I think it is certainly an indicator. It is something you have to focus on. You can't ignore those. You can think of some of those as near misses. The difficulty with that is deviations get lumped in together, without much expertise or much explanation about what was the nature of the deviation. And, so, yes, those are important to consider, but it is important to consider the limitations of those kind of measurements also.

CHAIRMAN HALL: If we could just take a minute and sort of walk through the system. As I basically have attempted to understand the system, we have an airplane that is delivered to you and it has, it is manufactured by, and with USAir any number of various outstanding companies. What -- but that aircraft, of course, is dependent on its systems. Do

you all get involved or do you do any analysis of the particular aircraft that you have and its measure of operations? How would you be involved in that, sir?

THE WITNESS: Well, certainly we do, and I'll try and be careful here and talk about things I know and tell you the things I don't know. But a good example of that is that each of the major component manufacturers, in each of the engine manufacturers and each of the aircraft manufacturers, we have an office. They have an office with USAir and we stay plugged into them. So we are doing analysis.

They take our maintenance data. There is a very cooperative, in fact, it is hard to draw the line between these offices sometimes because they are taking our data from off the line maintenance and we are inputting it them to tell them particular problems we have with the third stage of a compressor or with any other aspect, part, that, hey, that is not working well.

Their reputation is on line with how we treat their equipment. Our reputation is on line how their equipment serves us. So it is hard to draw a line between companies on this, because we are really all in it together. So there is a very important cooperative sharing of data, sharing of ideas and response to

complaints.

So just when Boeing puts an aircraft on the ramp for USAir, clearly, and as illustrated throughout these deliberations, they are not done with it. And when we pick it up, it is not -- we are in it together. We are vitally interested in the quality of that product, for obvious reasons. They are vitally interested in how we take care of that product. That's why they keep data flowing to us.

Some of the exhibits show, both in flight aspects, characteristics, information, as well as in maintenance information, there is that exchange of data. And that's the way it should be, and I think it is a very health situation. And we respond to that data. We take their suggestions, fold them into our flight operations manuals, into our maintenance manuals. It is a very health relationship I believe.

CHAIRMAN HALL: Secondly, I guess once you got the plane, you have got the crew and you have got to provide either, you either hire the crew already trained or you have got to train the crew.

Now, I mentioned earlier your distinguished record in the military and I am told that a lot of pilots now, instead of coming out of the military and training, are privately coming from private flight

safety foundations and other private institutions or educational areas that provide training and, you know, what type of look do you do in terms of your pilots and training, and particularly the area of cockpit discipline? How do you look at that area as part of your overall safety program?

THE WITNESS: Well, in my other life, I used to work hard as the Personnel Deputy Chief in the Air Force to stop that flow. We were complaining about the rape of military pilots by the airlines always grabbing them out and attracting them and pulling them away. Now I am very thankful for that flow because I consider military pilots an asset to the civil aviation industry.

And as I understand it, about 50 percent of USAir's pilots were trained in the military, I think that is a ballpark figure. The figure doesn't matter. And there is a great -- and that is a good number. There is a great cross-flow of information.

Each pilot, first, any company is not going to hire an individual that hasn't met very strict FAA requirements to get a commercial license with the various ratings that come. And so they are going to come trained. But any company is foolish if they think that training is sufficient. And so there is an

ongoing training proposition -- challenge, and we have heard that discussed already this morning. And in that training process, you will do further evaluation. There is an ongoing evaluation process. Every year there is a thorough check given of knowledge and capability to perform.

So the individual, regardless of his background, or her background, brings to that -- they come in and then they are brought up to company standards. And they do that through the company training program and through the company evaluation program. But at that cross-feed, I think, the non-military-trained pilots get something in terms of discipline and understanding from their association and flying with military-trained pilots, and military-trained pilots get something from their flying with non-military-trained pilots. There is a great cross-flow and a cross-feed of information.

But the company has the obligation to bring people up to their standards, and those standards have to be as high in civil aviation as they are in the military or the company won't stay in business.

CHAIRMAN HALL: And will you just comment, how many employees did you say USAir has?

THE WITNESS: Forty-five thousand.

CHAIRMAN HALL: Forty-five thousand. That is an impressive number of people. And how many of those are mechanics, line mechanics and folks responsible for the maintenance?

THE WITNESS: About 10,000 is the number of mechanics that we have.

CHAIRMAN HALL: Could you just kind of tell me what are the systems in place, either currently in place to be sure there is a flow of information so that the individuals that are out there actually hands on the airplane, working on it when it is on the ground, if their safety concerns get to you?

THE WITNESS: Well, there is the audit system which is kind of a top-down, the internal audit system. The quality assurance system of maintenance itself is doing, looking at every critical maintenance process that goes on, every maintenance action, not just the process, but the actual changing of the tire, changing of the engine, has that quality assurance. That is a safety program in my mind.

Maintenance has a safety officer, and we, each of the shifts have a safety officer. Each shift within the company has a union safety assigned person on the shift and they work with their safety coordinator on the shift, and they work with the

foreman. So there is a whole organization, a grass roots organization that has safety as its core interest.

That information, we have monthly, we have regular safety council meetings with those representatives getting together from the company. They have them at the base level, those kind of meetings where safety items are brought up. So the whole quality assurance, safety structure is closely intertwined and integrated with that flow of information up.

Now, is it as good as it should be? And I would say we are going to improve that, and that data collection system that I talked about, the more readily available forms and us reaching out maybe more aggressively we hope will improve that data flow. So I would say the structure is there, we just want to make sure that every employee understands that structure and is enthused about using it, knowing they will get a response to their input.

CHAIRMAN HALL: And finally there is a group of people that basically I guess are extremely important because they pay the bills, the passengers. What input, if there are safety concerns that the passengers had, does USAir have anything, structure in

place that would get those concerns to your attention?

THE WITNESS: Well, we have customer service forms that are out there, but I would not try and tell you that they have a safety orientation. I feel fairly comfortable that passengers that have a safety concern would use that customer service complaint structure to get that to our concern, to our attention.

But I am not sure we have done all that we can in that respect to make sure that the customer feels that that is not just a service complaint in terms of the seat is hard, or the coffee is cold, but in fact it is also a safety avenue. It is there, but from your question, I will tell you I don't walk away with a warm fuzzy.

CHAIRMAN HALL: The other item I wanted to ask you about, General, because I am, first of all, obviously pleased. One of the things the Board has recommended over the years is the importance of a corporate culture that builds safety into the factor and having someone that has access to the Chief Executive Officer and the highest levels. But I must admit coming from Washington, D.C., presently, where everyone claims to have access, I must ask you, do you, what is your access to Mr. Schofield and do you have a regular scheduled meeting with him or is that something

that you do, you meet with him when you think it is necessary or he is available?

THE WITNESS: I feel very comfortable with the access that I have because, first, he has answered every phone call that I have made. He has made an appointment or made a place on his calendar for every appointment I have asked for. I called up and I said we need to go to this corporate safety meeting and he immediately gave me six dates for the next six months when we could have that meeting. So I feel very comfortable saying I have all the access that I need. So I am very comfortable with the access.

CHAIRMAN HALL: When you have the monthly safety meeting, who is in attendance?

THE WITNESS: Well, I have been here eight weeks and our first one is next week, early part of, within the first week of February. So if I can defer that, I will give you a report back.

CHAIRMAN HALL: Okay, sir. General, I really appreciate your testimony, and I want to assure you that this Chairman has no question of the commitment to safety of all the parties that are involved in this investigation. Everyone has invested too many of their hours and man-hours and interest and I know that that extends not just on a company, but on a personal basis,

because I have seen the anguish of some of the individuals that have come up here trying to work that have been frustrated with their inability to exactly pinpoint to this point. And let me emphasize that we still feel that we are going to, this investigation will lead us to a probable cause.

But let me ask you a final question. You had mentioned that you had been involved in the Air Force in a capacity maybe similar to mine or similar to one of our investigators. Is there any suggestions or any areas that you think, other areas that we should explore or anything that you might want to add that would assist us in this investigation?

THE WITNESS: Well, I appreciate that question, Mr. Chairman. I guess I would say that we have found, just, I have found in accidents, a lot of them look like there is no answer and you keep pressing on, and you are almost doing it rotely, doing the things that you have learned to do in the past, looking at every little avenue, and you will say, oh, there can't be any answer down that little narrow alley. But you keep pressing down the narrow alleys and suddenly someone finds an answer in a least expected place.

I don't have, I can't identify any new alley. I think we have gone over, over those 40 years of

getting better, and identified most of the alleys. So I don't have any suggested new alley. But I just think perseverance, pursuing down the alleys that you have directed people toward would be I think the best advice that my experience would lead me to offer.

CHAIRMAN HALL: Thank you very much, General, we really appreciate your testimony.

We will take a 15 minute break and reconvene for our last two witnesses.

(Whereupon, at 10:05 a.m., a brief recess was taken.)

CHAIRMAN HALL: We will reconvene this hearing. Before I call on our next witness, and my questioning of the General. The General and I were discussing the number of different individuals and groups that are responsible and have an important role in the area of flight safety. And we discussed everyone from the manufacturers of the aircraft and the systems to the flight crew, the cabin crew, maintenance crew, and the passengers, and the Chairman omitted the dispatchers.

And the Transport Workers Union of America are observers here and they are the dispatchers for USAir and I appreciate their proactive way of coming up and bringing to my attention that they are an important

part of that equation. And I guess the General has probably stepped out of the room but I am sure that he is going to be as receptive to input from the dispatchers as he is going to be from any other group in performing his important safety mission for USAir.

With that, our next witness is Captain David Hyde. He is a training pilot for the Boeing Commercial Airplane Group out of Seattle, Washington.

Has Mr. Hyde been sworn, Mr. Schleede?

MR. SCHLEEDE: Yes.

(Witness testimony continues on the next page.)

CAPTAIN DAVID HYDE, TRAINING PILOT, BOEING COMMERCIAL AIRLINE GROUP, SEATTLE, WASHINGTON

Whereupon,

DAVID HYDE,

was called as a witness by and on behalf of NTSB, and, after having been duly sworn, was examined and testified on his oath as follows:

CHAIRMAN HALL: Welcome, Mr. Hyde. Mr. Schleede will begin the questioning.

MR. SCHLEEDE: Captain Hyde, give us your business address for the record, please?

THE WITNESS: Yes. Boeing Commercial Airplanes, Box 3707, Seattle, Washington.

MR. SCHLEEDE: Could you give us a brief description of your background and education that brings you to your present position?

THE WITNESS: Yes, sir. I started flying in 1959. My background is in general aviation. I was a corporate pilot for a couple of years. 1967, I joined Frontier Airlines as a First Officer on Convair-580's. I went through 737 initial training in 1974. In 1978 I went to work in the Frontier training department as a Check Airman on the Convair-580's. A couple of years later I qualified as a Check Airman on the 737.

I stayed with Frontier until the airline went out of business in 1986. It was bought by Continental. I flew as a Captain for Continental for a year and a half and then I joined the Boeing company as an Instructor Pilot. I am currently qualified at Boeing as an Instructor Pilot in the 737, 757, 767 and 777 aircraft. I have a little over 21,500 hours total fight time and a little over 8,400 of that is in the 737.

MR. SCHLEEDE: Thank you very much. Mr. Leonard will continue.

MR. LEONARD: Thank you. Captain Hyde, can you hear me okay, sir?

THE WITNESS: Yes, sir.

MR. LEONARD: So just to recap for a moment, your flight experience includes not only extensive airline operation as a line pilot, in addition to that, a substantial amount of training time as an Instructor Pilot, Check Captain?

THE WITNESS: Yes, sir.

MR. LEONARD: And if I heard you correctly, Captain Hyde, you started flying the 737 in 1974, so about 20 years, is that correct, sir?

THE WITNESS: Yes.

MR. LEONARD: And a substantial amount of

that flight time is in the 737 300 aircraft, without asking for a breakdown?

THE WITNESS: Yes. It is, the majority of my flight time in the 737 is in the 200, but I have been flying the 300, 400, 500 since 1988.

MR. LEONARD: Boeing, in the training area, Boeing aircraft commercial company flies under Part 121, is that correct, sir?

THE WITNESS: Our training is conducted under Part 121. We are a certified 121 training center. Our flight operations are normally done under Part 91. Whenever we are working with an airline where I am providing initial operating experience for the airline crew, then we are operating under their 121 certificate.

MR. LEONARD: I see. Thank you.

I would like to discuss with you some specific training maneuvers, Captain Hyde. Would you refer to Exhibit 2-G, sir, page 9?

THE WITNESS: Yes, sir.

MR. LEONARD: That is an excerpt from the USAir Pilots Handbook, "Abnormal Operations," and would that be, although that is not your document from Boeing, that is essentially the same kind of a document?

THE WITNESS: The procedure is the same. They have a note at the bottom that is a little bit different.

MR. LEONARD: Okay. The procedure at the bottom, Captain Hyde, that refers to yaw damper, has that been the procedure for the yaw damper malfunction as far back as you recall, sir?

THE WITNESS: You mean the only procedure or?

MR. LEONARD: Yes, let's just say, let's discuss that, what type of procedures are used where?

THE WITNESS: Yes, this is the procedure that is contained in the Operations Manual and the Quick Reference Handbook. There is another procedure in the Airplane Flight Manual which states that if directional hunting or rudder oscillations occur, turn the yaw damper off.

MR. LEONARD: Okay. Is that the recent change that --

THE WITNESS: Yes. Well, it is -- it has been in the Airplane Flight Manual every since I have been in the airplane.

MR. LEONARD: As far as an abnormal operations though, this has been the procedure that has been in effect for some time?

THE WITNESS: In the Operations Manual, yes.

MR. LEONARD: Okay. Have you in your experience ever had a problem with a yaw damper that you recall, Captain Hyde?

THE WITNESS: I don't recall ever having a problem with a yaw damper. I believe that earlier when I was flying for the airlines and we were flying the dash-200 with a SP77 auto pilot, there was a limitation on the use of the aileron yaw channel above 35,000 feet with a yaw damper inoperative, and I may have experienced a time when I was operating the aircraft under those conditions.

MR. LEONARD: That's probably it. Well, okay, there was a MEL restriction on the 200, correct?

THE WITNESS: Yes.

MR. LEONARD: Which is not, there is no MEL minimum equipment list restriction on the dash-300, correct?

THE WITNESS: No, there is not. None.

MR. LEONARD: Yes. Would you please refer to Exhibit 2-L for us, please, sir? Which is an excerpt from the Boeing 737 Operations Manual.

THE WITNESS: Yes, sir.

MR. LEONARD: And I would like to speak for a moment about the maneuver, uncommanded yaw, which is highlighted as the change to that Operations Manual

dated December 9th, 1994. Is that, that procedure is a new procedure, correct, sir?

THE WITNESS: It was added to the Operations Manual and the Quick Reference Handbook, yes, sir.

MR. LEONARD: I see. Do you know the background of that, why that was entered in there, Captain Hyde?

THE WITNESS: Yes, we had gotten a telex from our Boeing Field Service Representative in Paris. Air France had had an incident with the yaw damper and they were pointing out that there was the procedure in the Airplane Flight Manual that was not contained in the Operations Manual or the Quick Reference Handbook, and they were wanting to know why there was this difference.

We put it through our normal procedures to check it out and go through the process. We agreed with them that it should be in the Operations Manual and the Quick Reference Handbook. That, this change was approved last July to be included in the next block revision to the manuals, which was December 9th.

MR. LEONARD: Okay. Thank you, sir. Would you please describe to the Board the type of training that flight crews being trained by Boeing receive in the use of standby rudder?

THE WITNESS: Yes, sir. There are procedures in the Quick Reference Handbook that require the flight crews to place the flight control switch in the standby rudder position. These are associated with hydraulic non-normals. It would be with the loss of hydraulic system A. Procedure would require the flight crew to move the flight control switch to standby rudder. The same thing with flight control B and then there is the procedure. If you lost both hydraulic systems A and B, it would require you to do that.

There is another procedure for flight control low pressure light. That light would come on with the loss of the hydraulic systems. That would require the flight crews to go to standby rudder.

MR. LEONARD: And those are the only procedures as far as you know in the use of --

THE WITNESS: Yes.

MR. LEONARD: To go back for a moment, sir, I jumped ahead of myself. As far as yaw damper training is concerned for flight crews, could you discuss with us what type of training flight crews receive in the area of dutch roll or yaw damper malfunctions?

THE WITNESS: At Boeing we do not do dutch roll training in the 737 aircraft. We think that the dutch roll tendencies of the aircraft are very mild.

It is not much of a maneuver.

The yaw damper is covered in the fixed based simulator sessions. There is a couple of lessons where it is discussed at length in the briefing process and then the flight, the students will experience a yaw damper inoperative during the flight portion and go through the procedure.

MR. LEONARD: Would that type of malfunction include a light illuminating or would it be any kind of a yaw?

THE WITNESS: No, it is just associated with the light.

MR. LEONARD: With the light, I see. Okay.

Captain Hyde, would you refer to Exhibit 2-R, please, sir? That's a Boeing Flight Operations Review dated July 13th, 1993. I wonder if you would give us some information, background information on that publication, how it is developed, and if you know how it is distributed, we would appreciate that.

THE WITNESS: Yes. The Flight Operations Review article, it is titled "Guidelines for Situations Which are Beyond the Scope of Non-Normal Procedures." This was written by the Flight Training Department at Boeing in response to some requests that we had gotten from several airlines to expand this type of

information. It was written, the distribution, we send ten copies to each of the Boeing operators that we have records of. Five copies go to the Flight Operations department and five copies go to the Maintenance and Engineering department.

MR. LEONARD: Are some of these procedures or techniques implemented in your training?

THE WITNESS: Well, certainly. During the training, you are always trying to enhance the students' awareness of what is going on around them. You know, making them alert to anomalies that they can experience. Just looking at the page here, down at the bottom, we talk about, you know, if aileron control is affected, rudder inputs can assist in countering unwanted roll tendencies, and the reverse is true, is also true if rudder control is affected.

We discuss this and cover these procedures in our training during our engine-out familiarization. Our flight crew training manual, Section 2, page 25, has a statement in it under "Instrument Conditions," "the instrument scan is centered around the attitude indicator. Roll is usually the first indication of an asymetric condition. Roll control" and then in parentheses "(ailerons) should be used to hold the wings level or maintain the desired bank angle. The

rudder should be applied to approximately center the wheel."

So these type things, it is just, it is an emphasis, we carry it through the entire training process.

MR. LEONARD: Thank you. I would like to change, shift the emphasis for a moment. We have discussed in previous testimony the fact that the 737 300 has a somewhat advanced auto flight system which includes auto throttles, auto pilot flight director system which receive information from a fairly advanced flight management computer.

Could you please compare this system with, say, older generation aircraft, please?

THE WITNESS: Well, the 737 airplane has evolved quite a bit from the initial 100, 200 design. The first aircraft that came out were, used the SP77 auto pilot which provided the ability to track VOR's. You could actually fly a coupled ILS approach.

As the airplane continued to evolve, especially when fuel conservation became such a big issue, they started putting performance, management computers, or performance data computer systems in the airplane which would control, give the pilot vertical guidance and fuel economy for flight.

The system continued to grow with the development of the 300 model aircraft, and it was, it also included the ability to provide lateral navigation through the flight management computer system. This is actually quite a leap forward.

The system later continued to grow to include the glass cockpit and the electronic flight instrument system.

MR. LEONARD: If you would for a moment, run us through or lead us through a profile, and I will develop my parameters for you here as we go. Take it as a crew, say, is descending to a specific altitude and, say, making a turn. Use your own judgement, try to fly us through how a crew would program something like that and how the auto pilot would respond to that type of information.

THE WITNESS: Well, to start with, at Boeing we recommend that the crews program the flight management computer system during non-busy parts of the flight. We don't recommend that they program it in terminal areas where they should be directing their attention for traffic and other duties.

To program a descent in it, if you are flying the aircraft in vertical navigation, the system will actually compute based on speed or altitude

restrictions that the pilots put in the system over a given way point, it will back up from that way point and compute a vertical descent path and a top of descent point.

Once you reach the top of descent point -- or excuse me, as you are approaching the top of descent point, before the aircraft will actually start down, the pilot is required to change the mode control panel altitude in the aircraft.

MR. LEONARD: And that is an instrument right in front of the pilot?

THE WITNESS: It is an instrument on the glare shield, the mode control panel. If the pilot does not change the altitude in the mode control panel, then he will get a message advising him that he needs to reset MCP altitude.

Once he does that, which he should not do until he gets his clearance from air traffic control, sets the lower altitude in, then as the aircraft approaches the top of descent point, it will begin its descent. And it will make this at the most economical method.

MR. LEONARD: And by adjustment of throttle position, then the rate of descent --

THE WITNESS: It will compute it at throttles

in idle. It will make adjustments, if you tell the system that you need to use like engine anti-ice, then it makes the proper adjustments to maintain the proper engine RPM.

MR. LEONARD: I recognize that there are some differences in this aircraft, and even the more advanced airplanes, but would this aircraft's flight system, auto flight system, compare in degree of complexity to, say, the newer aircraft even, the 777 that you are flying?

THE WITNESS: Yes, to a degree it does. There is, you know, there is even more advancements in the new aircraft. But this is by no means, you know, a non-advanced aircraft.

MR. LEONARD: How dependable is this auto flight system, Captain Hyde?

THE WITNESS: It is very dependable. You know, it is like any computer system. You know, the pilots have to program it correctly, you know, provide it with the right information for it to be able to do its job.

MR. LEONARD: And what type of specific training does Boeing provide the crews that go through your training program in the use of this auto flight system?

THE WITNESS: Well, the Boeing training program is a transition course which means that the pilots that we train have already been flying jet equipment. So that we are teaching them the particular aircraft that they are going to school on, in this case, the 737.

A large part of the training that we do is on the systems. The flight management computer is a large part of that training.

MR. LEONARD: Would you for a moment, Captain Hyde, refer to Exhibit 2-T, please? 2-T, "tango." And that is an excerpt from the Boeing 737 flight crew training manual. And specifically, it is talking about automatic flight. The section to which I would to refer, sir, is on the right hand side, the second paragraph. It says, it talks about automatic complacency, and you could put in different words and substitute complacency. Could you discuss with that, with us for a few moments that concept and what your reaction is to it?

THE WITNESS: Well, there is a concern as the airplanes become more automated that the pilots are kind of taken out of the loop of, you know, what the airplane is doing. You know, we are concerned about this. We spend a great deal of time in training trying

to prevent this automatic complacency.

You know, these systems work extremely well. As pilots get more used to them in the training environment, they want to use them more. They start developing more trust in the system. You know, we are concerned that they will just totally trust it and not monitor the system, and this is not the case.

We try to emphasize during training that it is one pilot, one of the two pilots in the cockpit has a responsibility to monitor the airplane at all times. And, you know, they need to be aware that they can have system anomalies. They could have an auto throttle malfunction, that if they were not aware of, could create problems for them. They can have problems with the flight management computer system. It is not very common in this country, it does happen that you can get a map shift with the navigation system. You know, we have the ability in our simulators at Boeing to introduce map shifts so that they see these type of non-normals.

MR. LEONARD: In terms of the auto flight system on the 737 300, if there were a malfunction of a flight control unit, some aileron, elevator, rudder, how do you think the auto pilot system, auto flight system would respond to that type of malfunction? Do

you have any thoughts on that?

THE WITNESS: I think the auto pilot is trying to, is going to try to do the best it can to maintain the parameters that you have asked it to maintain. I know the auto pilot on the 737 is a two channel, you have an aileron channel and an elevator channel.

We, again, spend a lot of time in training, going over with the pilots the necessity for maintaining proper rudder control, especially when they are flying the aircraft single engine. They can fly it single engine on the auto pilot, but they need to understand that as thrust, speed changes are made, that they have to keep the rudder in trim. You know, we spend quite a bit of time with this. We also during the training have them fly single engine ILS on the auto pilot to emphasize the rudder control more.

MR. LEONARD: To shift for a moment, Captain Hyde, as an experienced pilot and instructor, what thoughts would you have on the subject of transfer of aircraft control within a cockpit?

THE WITNESS: Well, this again is something, you know, it is part of Boeing's cockpit resource management, you know, that you teach the crews.

I can go back to the point I just made, that

somebody has to watch the airplane at all times. You know, we emphasize to the pilots that they, any time that they have to, if they are the pilot that is flying and they have to divert their attention away from monitoring the aircraft, that they transfer control to the other pilot, do whatever they need to do, you know, get an approach plate out of their flight bag or whatever, and then once they are prepared to devote their full attention back to the aircraft, then they advise the other pilot that they are regaining control.

MR. LEONARD: Earlier this morning, Captain Traub from United testified about an advanced maneuver package that they are implementing or have implemented into their program. What are your thoughts, impressions on that program, Captain Hyde?

THE WITNESS: Yes. You know, I think United, you know, should be commended for the job they have done in this area. This is training that historically has not been presented to the airline pilots. I know that the Boeing company is becoming involved with this.

There was a Flight Safety Foundation meeting in Lisbon, Portugal last November that Boeing attended. They developed a task force to study the recovery from unusual attitudes and, which actually is chaired by Captain Ed Soladay at United, and Boeing is a member of

this task force. So we are looking at it.

I think that the training would be very beneficial, but I think that it is something that has to be studied before implemented.

MR. LEONARD: With your extensive flight experience in all phases of airline flying, line flying, training flying, could you share with us any thoughts that might have that might help us in this investigation, or anything else you would like to suggest.

THE WITNESS: Well, I am not an accident investigator and I haven't been, I have not participated in the investigation. You know, I was not a member of any of the committees and, you know, I really, the bulk of my knowledge was what I have heard here the last couple of days.

MR. LEONARD: Thank you very much, Captain Hyde, I appreciate it. I have no further questions.

CHAIRMAN HALL: Do any of the parties have a question for this witness? I see two hands.

Mr. Purvis with Boeing Commercial Airplane Group.

MR. PURVIS: I would like to go last.

CHAIRMAN HALL: Oh, I am sorry. Yes. Captain, with the Airline Pilots Association, as a

courtesy we always let, if there is a company representative, let them have the last question, and the Chairman overlooked that.

Captain, please proceed.

CAPTAIN LeGROW: Thank you, Mr. Chairman.

Good morning, Captain Hyde.

THE WITNESS: Good morning.

CAPTAIN LeGROW: Just a couple of areas I would like to talk about. Earlier, Mr. Leonard cautioned you about some yaw damper changes in the checklist and in the Operations Manual at Boeing. Do you know when the revision dated December 9th of '94, apparently Boeing made a change to add the uncommanded yaw.

THE WITNESS: Yes.

CAPTAIN LeGROW: Is that correct? You testified I believe that it was in the Flight Manual. Do you know how far back it was in the Flight Manual?

THE WITNESS: It has been in the Flight Manual as long as I have been in the airplane, so that would be back '74.

CAPTAIN LeGROW: Okay. And it just recently, your testimony was it was just recently moved to the Operations Manual since the Air France incident, is that correct?

THE WITNESS: Yes, that is correct.

CAPTAIN LeGROW: Were you here for Captain Johnson's testimony from USAir yesterday?

THE WITNESS: Yes, sir.

CAPTAIN LeGROW: Captain Johnson testified that USAir has taken the initiative to take this action and not only put it in their "Abnormals" but to put it into their emergency checklist as a memory item.

THE WITNESS: Yes.

CAPTAIN LeGROW: Would you say this exceeds what Boeing recommends?

THE WITNESS: As a matter of fact, I would. I don't necessarily agree with putting the procedure as a memory item. You know, the procedure is, was written to address a yaw damper malfunction. The yaw damper has very limited authority on the aircraft. Even if the yaw damper went to the full extent of its authority, it is not a non-controllable event. It is very easily controlled with aileron. I don't know, maybe not easily, but it is controllable with aileron.

To make it a memory item I think, the position that we take at Boeing is that we would prefer the flight crew in this type of an event, to devote their primary attention to the flight path control of the aircraft, not trying to remember what the memory

steps in the procedure is. Maintain flight path control and then let's go through the checklist procedure and analyze the situation and take care of the problem.

CAPTAIN LeGROW: So you would suggest that if a flight crew had an uncommanded yaw event, that he would take no action until he got the manual out and went through the abnormal procedures, as opposed to having it on the emergency checklist?

THE WITNESS: No, I didn't say he would take no action. What I said was that he would maintain flight path control of the aircraft. That is the primary concern.

CAPTAIN LeGROW: That would be assuming he had it, had control at that point?

THE WITNESS: Certainly.

CAPTAIN LeGROW: Thank you. You took Mr. Leonard through a descent in a new generation airplane with the flight management computer. Would you also, is it also not possible for a flight crew in a descent environment to control the airplane with auto flight without using the flight management computer?

THE WITNESS: Yes.

CAPTAIN LeGROW: Would you explain that just briefly?

THE WITNESS: There is actually three, maybe even four modes of descending the aircraft, if you want to consider glide slope. The preferred method, as long as air traffic control will let you do it, would be to do a V-Nav path descent, which is the most economical way of descending the aircraft.

The next step up would be to use a level change descent or flight level change, depending on which aircraft you are in. This type of a descent assumes that the auto throttles move to flight idle and the aircraft will descent at whatever speed you have selected in the mode control panel speed window.

The least desirable would be use a vertical speed descent. And this, you can select whatever rate of descent that you want the aircraft to maintain.

CAPTAIN LeGROW: So you can control the vertical path of the airplane without the flight management computer?

THE WITNESS: Absolutely.

CAPTAIN LeGROW: In other words, the pilot wouldn't have to have his head down and be typing on the computer keyboard, is that correct?

THE WITNESS: I hope that he doesn't.

CAPTAIN LeGROW: I would hope so too. Mr. Leonard touched on some areas about the complexity of

some of the airplanes and, if I may, Boeing makes some of the finest airplanes in the world, no doubt, and has expended a lot of technology to have these things available to the pilots. Boeing certainly would not suggest that the pilots would not use all these aids available to them, would they?

THE WITNESS: We would try to encourage the pilots to use the appropriate aids that are available to them. You know, obviously, with the technology, we find a lot of times, especially when pilots are new to the airplane, that they are still in the learning mode and there may be a tendency to try to overuse some of the technology. You know, this, we try to stress on them in training not to do this.

If you are in a situation where you are coming into an airport, you know, the best example is if you get a runway change for an ILS approach, is don't try to reprogram the FMC for the new approach. You know, all of the airplanes that we build now with the glass cockpit, have the ability to present the same display that were in the older generation aircraft. So it is much, much better to turn all the new stuff off, go back to the old stuff, fly your approach and pay attention to your airplane.

CAPTAIN LeGROW: Okay. Thank you. Were you

here for Mr. Traub's testimony, or Captain Traub's testimony earlier, and I believe Mr. Leonard asked you a few questions on the recovery for unusual attitudes. Mr. Traub testified that when Boeing put together their unusual attitude program at Boeing -- I mean at United, that the FAA wasn't involved. He also testified that no other domestic airline in this country that he is aware of offers this. He also testified that he was not aware of British Airways' program, like program.

My question is, are you are aware of an ATA study group that has been formed to study this issue in the airlines?

THE WITNESS: Right now I am because I heard Captain Johnson's testimony yesterday when he was discussing it. But prior to that time, I was not.

CAPTAIN LeGROW: Do you think that is an appropriate approach in your view to get the input of all the airlines in the industry, the manufacturers, the labor unions and everybody else together to put together a program that, and the FAA, of course, to get together to put together a program or to study to see if it is a worthwhile endeavor?

THE WITNESS: Certainly. You know, Boeing is participating through the Flight Safety Foundation with the task force to do just that. And I am sure, based

on past experiences, that Boeing will not consider doing that unless all the parties are involved.

CAPTAIN LeGROW: Thank you. One other area I would like to discuss, and that is with simulators. Do you, in your work at Boeing, do you instruct on the simulators as well as the airplanes?

THE WITNESS: Yes.

CAPTAIN LeGROW: And I know you are probably not a simulator engineer, and I know they are very complex machines, but do you know by any chance if the simulators used at Boeing or at most airlines, when simulators get to a 45, somewhere between a 45 or a 40, or a 60 degree bank, is this flight test data when it gets over that, or is it derived data?

THE WITNESS: I cannot state certain which it is. I believe that the aeropackage that Boeing presents, and this again is I believe, I don't know for an absolute fact, I believe the aeropackage is based on flight test data and it is only valid within the operating envelope of the airplane.

CAPTAIN LeGROW: So that would be?

THE WITNESS: It would be 45 degrees plus 15 degrees over bank, 60 degrees.

CAPTAIN LeGROW: So anything over 60 degrees to bank would either be extrapolated data or it would

be derived data, it wouldn't be actual flight test data?

THE WITNESS: I don't think that Boeing is going to take the airplanes out and start doing rolls and loops to gather this information.

CAPTAIN LeGROW: The point I am trying to make, Captain Hyde, is when you get in a simulator and you are getting in excess of 60 degrees bank, you are not dealing with real flight test data, are you?

THE WITNESS: As far as I know, you are not.

CAPTAIN LeGROW: So this would be derived?

THE WITNESS: I would assume.

CAPTAIN LeGROW: Thank you.

I have no further questions, Mr. Chairman.

CHAIRMAN HALL: Thank you, Captain.

Mr. Purvis.

MR. PURVIS: Captain Hyde, you earlier talked about the change in the Ops Manual and the addition of the uncommanded yaw to the Ops Manual. Do you recall the words that were in the Flight Manual that have been there since you can recall?

THE WITNESS: Yes, sir. I have them written down here on my notes. It is, "If directional hunting or rudder oscillations occur, turn yaw damper off."

MR. PURVIS: Thank you very much. I have no

other questions.

CHAIRMAN HALL: Thank you, Mr. Purvis.

Mr. Marx.

MR. MARX: I just have a few questions. You indicated in your testimony that even though the crew would be flying on auto pilot, they still monitor the controls.

THE WITNESS: Yes, sir.

MR. MARX: How do they monitor the rudder?

THE WITNESS: Well, again, it would probably depend on where they are in the flight. You know, a lot of times when I am flying the airplane, when I am in cruise, I will put my feet on the floor. Normally, up until the time I reach cruise, I always keep my feet on the rudder pedals, which would be the way you would monitor them.

MR. MARX: Does the auto pilot control rudder movement? I think we have had prior testimony to this, but --

THE WITNESS: On the 737 the auto pilot does not control the rudder at all.

MR. MARX: Thank you.

CHAIRMAN HALL: Mr. Clark.

MR. CLARK: No questions.

CHAIRMAN HALL: No Schleede.

MR. SCHLEEDE: Just a couple about the memory items, we were discussing the yaw damper. What constitutes what Boeing puts in their manual for a memory item?

THE WITNESS: The memory items are immediate attention items. You know, an engine fire. But, you know, even with an engine fire, there are times that, like an engine fire immediately after takeoff, we still say wait until you have aircraft control established. You know, we teach the students don't do anything but fly the airplane till you are at least at 400 feet. I know some airlines use 1,000 feet before they do anything. You know, it is, the memory items at Boeing are items that we feel need immediate attention. Engine fire, rapid depressurization, emergency descent, you know, these type items.

MR. SCHLEEDE: But an airline can add to the list that Boeing puts in the manual?

THE WITNESS: Certainly.

MR. SCHLEEDE: Is there a best way, in this particular instance with the yaw damper, a yaw event, either having a memory or not having a memory, is, in your view, one better than the other or one worse than the other?

THE WITNESS: Well, you know, I have read the

reports that came back from the Air France incident and, you know, the crew at Air France handled the situation I think exactly the way we would have expected them to, and that is they maintained flight path control of the airplane. They analyzed the situation. You know, they had the uncommanded yaw. They put their feet on the rudder pedals, they hadn't moved. They checked the yaw damper indicator on the front panel and noticed that it was deflected. They deduced that the yaw damper had malfunctioned and they turned the switch off.

MR. SCHLEEDE: Are you familiar with the Continental Airlines event over Honduras?

THE WITNESS: A little bit, yes, sir.

MR. SCHLEEDE: Are you aware that the flight crew did not turn off the yaw damper?

THE WITNESS: Yes.

MR. SCHLEEDE: Do you, does that present a safety flight item, if you do have a malfunctioning one and try to land with it?

THE WITNESS: Oh, I don't think so. Again, the yaw damper has limited authority. You know, you can control it with nothing but the ailerons if you desire.

MR. SCHLEEDE: Thank you very much.

CHAIRMAN HALL: Mr. Laynor.

MR. LAYNOR: No questions.

CHAIRMAN HALL: Captain, thank you very much for your testimony.

THE WITNESS: Certainly.

CHAIRMAN HALL: You are excused.

(Witness excused.)

CHAIRMAN HALL: Our final witness, if I can find our final witness, for today is Mr. David Bowden, the Principal Operations Inspector for the Federal Aviation Administration in Pittsburgh, Pennsylvania.

(Witness testimony continues on the next page.)

DAVID L. BOWDEN, PRINCIPAL OPERATIONS INSPECTOR, FEDERAL AVIATION ADMINISTRATION, PITTSBURGH, PENNSYLVANIA

Whereupon,

DAVID BOWDEN,

was called as a witness by and on behalf of NTSB, and, after having been duly sworn, was examined and testified on his oath as follows:

CHAIRMAN HALL: Mr. Bowden, welcome. Mr. Schleede will begin the questioning.

MR. SCHLEEDE: Please give us your full name and business address for our record.

THE WITNESS: David L. Bowden, Pittsburgh, Pennsylvania.

MR. SCHLEEDE: And you work for the FAA?

THE WITNESS: That's correct.

MR. SCHLEEDE: Your position at the FAA?

THE WITNESS: POI, Principal Operations Inspector.

MR. SCHLEEDE: Could you give us a brief description of your background and training that qualifies you for your current position?

THE WITNESS: Yes. I graduated from college in 1968. I joined the Air Force as a pilot, went

through pilot training, then for the next five years flew KC-135's.

When I left the Air Force, I went to Spartan where I got my CFI and my Airframe and Power Plant Mechanic's Rating. I then went with Mission Aviation Fellowship, was assigned in Brazil as a missionary bush pilot in the Amazon area and spent three years there.

I returned to the States and worked in a college for six years and then returned to aviation. I was a corporate pilot flying Lears and Hawkers for a year prior to coming in the FAA.

I came into the FAA in 1987 here in Pittsburgh. I was originally assigned as an assistant to the POI. After I believe a year and a half in that position I became the Air Crew Program Manager on the DC-9's and then a little over four years ago became the POI.

I have a CFI, ANP, an ATP. I have type ratings in the Boeing 707, 720, Learjet and DC-9.

MR. SCHLEEDE: Approximately how much flying time do you have?

THE WITNESS: Four thousand hours.

MR. SCHLEEDE: Okay. Thank you. Mr. Leonard will proceed.

MR. LEONARD: Can you hear me okay, Mr.

Bowden?

THE WITNESS: Yes, sir.

MR. LEONARD: Would you please explain to us your functions as a Principal Operations Inspector?

THE WITNESS: I am the liaison between USAir and the FAA on operational issues. That includes pilots, flight attendants, dispatcher would be the normal areas you would think of. Just to give you a little overview of what my job entails, as you are probably aware, USAir flies 2600 flights a day, almost a million flights a year, and in all of these areas there are operations specifications that govern these and I approve those op specs.

There is also a major training program that USAir has. I have referenced it in the past as a university. It is made up of almost 5,000 pilots, over 9,000 flight attendants and 150 dispatchers, almost 15,000 individuals within this university in those three separate sections.

You heard testimony from Captain Johnson yesterday. He heads up the pilots section of this training program. There are within this training section somewhere around 130 approved programs, and I approve those, each one of those programs.

I have a staff of 12 inspectors. Each of

those inspectors are rated pilots in one of USAir's equipment types. My staff is broken down into eight air crew program managers. They are the technical experts on each piece of equipment that USAir operates.

They go through the same identical training program that a USAir pilot would go through. In addition to that, they also go through the check airman training program. And then their function is to work within that training program with the flight manager, with the check airman, with the air crew program designees and to monitor the training, monitor the check airman, monitor the manuals, recommend approvals to me, and be really the technical expert on each piece of equipment.

The other four people in the office, in the assistant's shop, do, they assist the APM's at times, because they are typed in the airplanes. They so surveillance as well. They also do the administrative functions.

We handle, you can imagine with almost a million flights a year, there are numerous administrative functions. We handle passenger complaints. We handle incidents. We are normally investigating five to fifteen areas each day on a continuing basis. There are numerous events that

happen out there, rejects, turn backs that we take a look at, and this requires the staff to be quite busy doing the administrative functions.

In addition to this staff, there is also a cabin safety specialist in the office, and she is not assigned directly to me, she is assigned to region, but she spends about 90 percent of her time working on the cabin safety issues.

MR. LEONARD: Thank you. I would like to ask you at this time to refer to Exhibit 2-A, page 23, sir. In this, on this page we are talking about several issues relating to your functions. The section to which I would like to refer now is the third to the last paragraph. It starts off with, "He has initiated a spirit of partnership with USAir." I wondered, Mr. Bowden, if you would please expand upon that and explain to us what that area involves.

THE WITNESS: Well, about five years ago the FAA came out, the FAA Administrator came out with a compliance through partnership philosophy. And when I first became the POI a little over four years ago, we were just in the initial stages of discussing altitude deviations with both ALPA and the company.

At that point the philosophy we were using in the FAA was whenever there was an altitude deviation,

air traffic control would send us a package on that. We would do a certificate action, a violation process on the crew, and that was pretty much the extent of what we were doing.

USAir was running anywhere from three to four altitude deviations per month and it was the major problem area that had been identified by all the parties concerned. ALPA and the USAir safety department and the FAA got together at that point and decided that there must be a better way to really take a look at this problem and see if it couldn't be solved.

And that created the Altitude Awareness Program. Basically, the way this program got underway is ALPA and the company went out and did some extensive research of all the other carriers out there and what their procedures were. They found some procedures that, from a smaller company, that, and this smaller company was operating DC-9's and had not had an altitude deviation.

They incorporated these procedures into their procedures. And then what we did was, as we had altitude deviations after that, we brought the crews in to find out why it was happening. We did an intensive study of this. And this program lasted for about a

year and a half.

And by the time this program ended, the altitude deviations were running about one-half deviation per month, so it was a major improvement in the whole area. And it just showed us a new way of doing business.

MR. LEONARD: Thank you. USAir has experienced several accidents in recent years, two of which occurred in 1994. Would you please describe what the response has been by your FAA office to these accidents?

THE WITNESS: I think it has been stated already by the time an accident happens, it is a little late to be doing something. You try to be proactive. And what we have tried to do with the Altitude Awareness Program is to do things that are proactive, that keep these kind of things from happening in the first place.

Obviously, we look at each individual accident, and if there is something to be learned from that accident, then we want to take advantage of that and make changes.

However, about a year ago we started some initiatives within the company that were reviewed as a result of the two accidents by upper level FAA

management. They were convinced that the initiatives we already had in place were the proper ones. There were some slight modifications to those. But, basically, we had already started something prior to the accidents and that is our plan right now is to proceed with the initiatives that we had in place at that point.

MR. LEONARD: There have been several key management changes, changes in the key management personnel positions in training and safety departments at USAir in the last year or so. What is your perception of the significance of those changes?

THE WITNESS: Well, basically, what USAir has done during the past year or two is they have offered some early out incentives to some of their senior pilots and some of the management people have taken advantage of this. It is the normal turnover, retirements and people replacing them. So, therefore, it is just a normal chain of events.

You have just heard from General Oaks. My perception in this particular case is that that represented something more, that also was a retirement. But when they made the, when they hired General Oaks, they changed the structure. And I had always had a good working relationship on the operations side with

the director of safety.

However, General Oaks coming in and the change of the structure now means that the other areas within USAir, the maintenance area, the flight attendant area, the ground services area, are all going to come together under one umbrella. So that the safety issues that go beyond operations, it is going to be a lot easier in the future to deal with those issues.

MR. LEONARD: Thank you. There have been some reports of USAir aircraft departing gates, passenger flights, without the appropriate dispatch fuel on board. I wondered in you would comment on those reports and the reaction of your office to those incidents, please?

THE WITNESS: I believe that was back in the summer of '93 when a series of events took place. At that point in time, USAir had made some changes to their fueling procedures, and I believe it was within about a one month period of time when the changes, a couple of changes, minor changes had been made, and two crews left Pittsburgh without the proper fuel on board. One turned around and returned to the field. Another one continued on to the destination. I believe there was another crew that taxied out without enough fuel

and came back.

When I became aware of this, the first thing I did was look at USAir's procedures to see if the procedures were adequate and if the carrier was in compliance. And although they had made some changes to their procedures, they still were in compliance. Fuel was still, was on the checklist. Fuel was on the dispatch release. And it, obviously, at that point, it is a crew problem if a crew does leave the gate without fuel.

However, because of the changes, and because there had not been any incidents and there were all of a sudden three of them within a short period of time, I decided it was worth taking a look into. And so in the spirit of partnership, we talked with the two First Officers who were involved in the takeoffs out of Pittsburgh. We talked with the crew that was involved in taxiing out without the fuel and coming back to the gate, to find out why it was happening, and to get some recommendations. And ALPA safety was involved with this, the safety department of USAir was involved with this.

I then sat down with my staff to talk about it, to see what kind of recommendations they had. I had a meeting with USAir's flight managers to talk

about the issue, to see what kind of recommendations they had. We talked with individual pilots, USAir pilots and out of that, we made several recommendations to the company. The company studied the areas well and instituted some changes. And since the changes have come in place, I am not aware of any further incidents.

MR. LEONARD: I would like to shift for a moment, please, Mr. Bowden, to the area of Advisory Circulars that are published by the Federal Aviation Administration. And could you first tell us how these Advisory Circulars are distributed to an air carrier such as USAir?

THE WITNESS: Yes, sir. We have Advisory Circulars, we have numerous documents that come in the office. Air Carrier Operations Bulletins, Handbook Bulletins. We review them to see if they pertain to USAir in the first place. There are some Advisory Circulars that only pertain to certain types of equipment that it would not be necessary for USAir to have.

My assistant then has a, is in charge of this area, and all of the Advisory Circulars and other documents that are required to go to USAir, he ensures that they receive them. And they go to whoever the appropriate person is. Some of them deal with training

issues. Some of them deal with operations issues.

Then what we have within our computer system is we have to acknowledge that we have in fact given these to the carrier. And we do this, we have two systems, one that goes directly to Washington, and also another one, a follow-up system as far as the region, Eastern Region, is concerned.

MR. LEONARD: I wish to ask you to refer to Exhibit 2-N, please, Mr. Bowden, which is an Advisory Circular, 121-59, "Air Carrier Internal Evaluations Program." I wonder if you could explain that briefly to us and tell us what USAir's response has been to that Advisory Circular?

THE WITNESS: Yes. In the past the carriers had a safety department and about up until I would say about four years ago there was a Director of Safety. And then at that point they brought in what is called, what they call at that point Internal Audit Check Airmen. These Internal Audit Check Airmen were Check Airmen off the different pieces of equipment.

They then teamed up with the Director of Safety and formed this Internal Evaluation program. Their role is to monitor the activities in the simulator. Go out and fly in route checks with the pilots. They actually do a similar role to what we do

as inspectors, in doing surveillance on the different activities within the company.

The difference that you have heard this morning is that as of the General Oaks coming on board. The director of safety in the operations area now reports directly to General Oaks, so the safety department has now been placed outside of the operations section of the company, which is in accordance with this Advisory Circular. So it is a step forward for that program.

MR. LEONARD: So would you say that their response has been very active, is that how you would characterize it?

THE WITNESS: Yes. In fact, what we have done because of this program and the positive viewpoint we had of this program, we do an assessment of USAir each year. It is something that we do in our office independently of anyone above us asking us to do this.

About three years ago I asked the Safety Department and the Internal Audit Check Airmen to come in and be a part of our assessment. And so that as we spend two weeks looking in depth at USAir within the training programs and things like this, to spot check for any trends or anything like that, the assessment and the Internal Audit Check Airmen have been part of

our team itself.

That really helps because then it is not just strictly the FAA looking at the carrier, it is the FAA and the Internal Audit department. They are seeing the problems with right us, and the corrective action has been a lot quicker because of this program.

MR. LEONARD: Would you please refer to Exhibit No. 2-O? That is another Advisory Circular, 120-56, which the "Air Carrier Voluntary Disclosure Reporting Procedures." Could you briefly describe that Advisory Circular and tell us what USAir's response has been to that?

THE WITNESS: Yes. Again, this is being handled through the USAir's Safety Department and, in my case, on the ops side, directly with the Director of Safety. As USAir itself finds areas of non-compliance, they are able then to contact me to identify that, and there is an elaborate process that we then go through, and the carrier goes through to make sure that that area is corrected. And the program actually is utilized more on the maintenance side than it is on the operations side, but we have utilized it and it has been a very effective program.

MR. LEONARD: There have been operational issues revealed through this program?

THE WITNESS: That is correct.

MR. LEONARD: Would you please refer to Exhibit 2-P, "papa." That's another Advisory Circular, 120-51-A, "Crew Resource Management Training." I think everyone here pretty well, pretty much has an idea of what that is. I wondered if you could tell us how you evaluate, assess USAir's adherence to that Advisory Circular?

THE WITNESS: Well, USAir had the advantage of having this Advisory Circular as they developed their program. So right from the very start, they used this guidance here and implemented their program in accordance with the Advisory Circular.

The goal of, long-term goal of CRM is to have CRM integrated into your program so much that you no longer have to even identify it as something separate. And my evaluation is that USAir is well on their way down that path. They have gone beyond what is involved here in this Advisory Circular.

MR. LEONARD: Will the implementation of the Advisory Circular on advanced qualification for training be a major part of what you just were talking about?

THE WITNESS: That's correct. Actually, what USAir has done within their training department at this

point is they have taken a step towards AQP in their training programs, incorporating CRM and going beyond what the Advisory Circular, and the next step really is AQP.

MR. LEONARD: I would like to shift for a moment, please, Mr. Bowden, to the flight crew training and, specifically, your monitoring of and oversight of the flight crew training in such areas as trend analyses, proficiency check failures and general thoughts along those lines as to how that relationship is working and how it functions, your department?

THE WITNESS: Now, is this question just in regards just to the training department?

MR. LEONARD: Correct. Just to the training department itself, sir.

THE WITNESS: Basically, the primary effort in this are is done by the air crew program managers. They are involved on a day to day basis with their individual training program and the check airmen involved.

If you look at what is involved in one training program, it is set up pretty much as a pyramid system. You have, first of all, within the carrier, you have you APD's, Air Crew Program Designees. These individuals are trained by the APM. They are trained--

MR. LEONARD: Excuse me. Those are USAir pilots, correct?

THE WITNESS: They are USAir Check Airmen.

MR. LEONARD: Correct.

THE WITNESS: And they pretty much considered to be the elite of the Check Airmen group. Of 200 Check Airmen within USAir, about 40 are APD's. These Check Airmen are trained by the APM. They are trained in how to give a type rating, how to give an oral evaluation. And basically, when they do this, they are working for the FAA. And so, they are under the guidance of the APM as they are conducting these activities.

Obviously, we do a lot of surveillance of these individuals. In 1994, we did 99 observations, surveillance activities on this group of 40 individuals. The Check Airmen group is another area that, obviously, we are going to monitor very closely. Captain Johnson already went through the steps that it takes to be a Check Airman and told of the involvement of the FAA in this process.

Our guidance is to look at a Check Airman that is assigned to Pittsburgh at least once every two years. So that means we would be required to do somewhere around 60 observations of Check Airmen.

In our office we don't consider that to be adequate. Our goal is to look at each Check Airman at least once a year. In fact, in 1994 we did 476 Check Airman observations and almost 85 percent of that was done by the inspectors in our office.

So we far exceed what the criteria is because the training program determines the product that is going to be out on the line. And so it is very important for us to do adequate surveillance on this.

Then when we go out on the line and we do our in route inspections, what we are actually doing is we are taking a snapshot of what is happening out there. And if we see problems out there, then we are going to go back and look at the training program, we are going to look at procedures and see if, in fact, those procedures are adequate.

MR. LEONARD: Take a specific maneuver at the level of training, either initial training or proficiency check type things. How are those trends of maneuvers of that are, let's say that in which a trend develops within an aircraft where their crews are having problems with a certain maneuver. How are those monitored by your APM and do you get involved or where do you get involved in the loop on that?

THE WITNESS: Each different Flight Manager

has a Standardization Committee, and the APM is part of that Standardization Committee.

MR. LEONARD: Who else is on that committee, sir?

THE WITNESS: Usually, they are Senior Check Airmen and then they have other Check Airmen within the fleet and I believe at times they would have someone from ALPA training department there as a representative as well.

They discuss the standards. They would be the ones that would look at the trend analysis from the different programs to make sure that if there are any deficiencies, they are addressed in the training program.

MR. LEONARD: And USAir has training simulators in other locations. How does your office perform oversight functions in those areas, those other locations?

THE WITNESS: What, basically Charlotte is the other major training facility. There is an APM in the office that is the APM on the F-28 and the simulator is down in Charlotte, so this APM travels down to Charlotte on a very regular basis.

On the 737 there are three APM's. There is one that is assigned to the 737 200, there is one that

is assigned to the 737 300 and one to the 400. Now the 200 is a separate program from the 300-400. So what I have done with the two APM's on the 737 300-400 is I have assigned one specifically to Charlotte and the other one to Pittsburgh. So that the individual that is assigned to Charlotte goes to Charlotte on a regular basis, and we do substantial surveillance in Charlotte as well as Pittsburgh.

MR. LEONARD: Do you feel that your office staffing is sufficient for your functions, numbers of people?

THE WITNESS: I have an excellent staff. I may have the best staff in the country. I am proud of the staff. I have APM's with years of industry experience. So the staff is very, very well qualified.

CHAIRMAN HALL: What is your ratio in terms of your staff to the people you oversee and have responsibility for oversight?

THE WITNESS: Well, I think there is a chart in the exhibit that shows that we are basically in the same ballpark as the other carriers are as far as our staff is concerned. When you think of basically 13 of us monitoring a carrier their size, it is an awesome responsibility.

CHAIRMAN HALL: Well, then would you please

respond to the question, is that enough people or not?

THE WITNESS: It is enough people based upon our surveillance assistance from the geographic community, and based upon the partnership philosophy that we have with the carrier.

Now, if you take away the partnership philosophy and you want the FAA to get involved in doing such things as giving the PC checks to the pilot group, then all of a sudden -- or type ratings to all the pilot group, then all of a sudden you quickly realize that we need somewhere in the neighborhood of 40 additional inspectors to give the type ratings and 200 additional inspectors if we are going to start doing all the work of the Check Airmen.

CHAIRMAN HALL: Is the safety partnership something that is acknowledged in the regulations?

THE WITNESS: That is correct. And I think it is very effective, and I think it is the way to go and I am happy with the staff, my personal staff, the way it is right now.

CHAIRMAN HALL: All right. Please proceed.

MR. LEONARD: Thank you. Earlier this morning Captain Traub presented United Advanced Maneuver Package training. What is your reaction to that training, Mr. Bowden?

THE WITNESS: I think it has some excellent areas in it. I think what you are really dealing in is a philosophy difference between what we have been working under in the past with the Appendix F maneuvers and what we are currently working with and what the future holds with the AQP philosophy.

The AQP philosophy allows a carrier to take a look at other areas other than just strictly the Appendix F maneuvers, do task analysis on them and decide if they are appropriate for that particular carrier.

As you are well aware, the FAA has already, I believe there has already been a letter from Tony Broderick where the FAA will co-sponsor with the ATA this committee, and so I look forward to seeing how this develops in the future.

MR. LEONARD: Mr. Bowden, based upon your experience and relationship with this airline and the accident that occurred in September, is there anything else you would like to share with us at this time?

THE WITNESS: No, sir.

MR. LEONARD: Thank you very kindly. I have no more questions.

CHAIRMAN HALL: Thank you very much.

Do any of the parties have questions for this

witness? I see one hand. All right, Captain LeGrow with the Airline Pilots Association, please proceed.

CAPTAIN LeGROW: Thank you, Mr. Chairman, I will make it very brief.

Good morning, Mr. Bowden.

THE WITNESS: Good morning.

CAPTAIN LeGROW: You referred to earlier in your testimony from Mr. Leonard, you made reference to the Altitude Awareness Program that was developed at USAir. Could you tell us, is this a program that is used just at USAir?

THE WITNESS: This program began at USAir, and I believe USAir was the first one that instituted the program. Last year I was involved in a meeting with ALPA and the company and Alaska Airlines. I know Alaska Airlines brought their POI and their management people and ALPA representatives to USAir to find out what the program consisted of. I had one of them approach me this week telling me how effective the program has become for Alaska Airlines and thanking me for my involvement in that piece.

I believe American Airlines also has adopted some of these same procedures. So it has spread to other carriers, yes.

CAPTAIN LeGROW: Thank you And USAir was the

leader in that and it has developed into other airlines then, is that correct?

THE WITNESS: That is correct.

CAPTAIN LeGROW: You mentioned, you have mentioned several times ALPA and I appreciate that, and you mentioned your relationship with the carrier. Could you just briefly explain how the pilots or the association fits into the picture as far as their relationship with management, the FAA, in the safety and training areas?

THE WITNESS: I am not sure I follow your question on that.

CAPTAIN LeGROW: I guess what I am trying to say, the question I am trying to ask is what the relationship with the pilots and the company and the FAA. Could you just speak briefly with ALPA, the FAA and the company in the training and safety areas?

THE WITNESS: Well, I think in all these issues it is extremely important. What we have done since the Altitude Awareness Program is we have kept that same philosophy. And so in some cases, when there are incidents that happen out there that are not deliberate in nature, we have worked with the ALPA safety group and management and the line pilots have actually come into the FAA office and have sat down

with us and have discussed exactly what happened out there on the line.

That certainly is not a good feeling for the line pilot to be at the FAA office. However, my experience has been that because of this Altitude Awareness Program, because of the trust that has built up between the parties involved, the line pilots have come in and have been extremely open and honest about what has happened. That has allowed us to find out why it happened and then this information has been put out both by USAir management and by ALPA in your magazine and has been very helpful for all the pilots within USAir.

CAPTAIN LeGROW: I thank you. Just one more area I want to touch briefly on. You were here for the testimony on some of the, on Captain Johnson's testimony on the changes to the checklist as far as the yaw damper is concerned. In your responsibility, you approve that checklist, is that correct?

THE WITNESS: That is correct.

CAPTAIN LeGROW: Your signature is on the checklist. Could you briefly just describe how the Equipment Manager or Captain Johnson, whomever approached you or your staff to make the changes and why the changes were made to move it to the emergency

checklist?

THE WITNESS: Yes. That normally comes, the interaction is normally between the Flight Manager and the APM and that took place in this case. It was within the past week or two I believe that I actually signed off the emergency checklist. I did that because of the recommendation from the APM.

I have heard the discussion here on that area this morning. Basically, USAir operates the airplane in line operations and they are required to do what is in the best interests of the safety of their passengers.

There are times when an emergency checklist might differ from what is in the AFM. The instance I can think of from my background on the DC-9 is with engine fire. I believe the AFM says that the first step in engine fire is to reach up and pull the fire T-handle.

Well, in actual line operations, most engine fires on the DC-9 are actually bleed leaks. So, therefore, what USAir's emergency procedure consists of is pulling the throttle back to idle first to see if the light goes out. And then if the light does not go out, then you pull the fire handle.

Well, in line operations, with passengers on

board, that is a higher level of safety because the engine at idle can be utilized later on if need be. In this case what USAir's concern was on the 737 was that there were reported cases where there may have been a hard over rudder and by turning the yaw damper switch off, it took care of the problem.

Whether that is true or not, I don't know, but the feeling was that it was important for the USAir pilots to know this verbatim rather than to have to open up their manual and go to a manual, because in an emergency situation like that, if there is ever a hard over rudder, there is no time to go to the manual.

CAPTAIN LeGROW: Thank you. I have no further questions.

CHAIRMAN HALL: Is that all, Captain?

Any other questions from the parties? If not, Mr. Marx?

MR. MARX: No questions.

CHAIRMAN HALL: Mr. Clark?

MR. CLARK: No questions.

CHAIRMAN HALL: Mr. Schleede?

MR. SCHLEEDE: I have no questions.

CHAIRMAN HALL: Mr. Laynor.

MR. LAYNOR: No questions.

CHAIRMAN HALL: I just have a few questions,

sir. My understanding is that you have been in this position with, as the Principal Operating Inspector for the FAA with USAir since December of 1990, is that correct?

THE WITNESS: That is correct.

CHAIRMAN HALL: I would appreciate it if you could kind of explain to me basically what your responsibilities are, how you see the role you are performing for the FAA in the capacity you presently occupy?

THE WITNESS: Basically, I am a supervisor. Since I have become the POI I no longer receive the technical training. I no longer go to recurrent training or get aircraft training any longer, I rely on the technical experts, the APM's and the other administrative people in the office.

My role then is to take their technical expertise and to approve training programs. I deal with the operations specifications, the approval process on the ops specs, and basically to be the liaison between USAir and the FAA on all operational issues.

CHAIRMAN HALL: And with what objective or purpose, to be sure they are training correctly, operating correctly, generally what?

THE WITNESS: Well, there's two major areas involved. One is to ensure that they are in compliance with the regulations and that is first and foremost. And the second major area would be to ensure that they have a high quality training program.

CHAIRMAN HALL: What measures would you use to determine whether they are in compliance with the regulations and whether they have a high quality safety program?

THE WITNESS: Well, the surveillance program would be the means that we check on this. We do surveillance within our office. The geographic inspectors throughout the country do surveillance. I believe there were somewhere in the neighborhood of 4,000 surveillance activities on USAir last year in the operations area. All of these reports come through me. If there are any write-ups on USAir, if there are any negative trends, they all come through me and we do continuous trend analysis on this area.

CHAIRMAN HALL: And essentially you are using measures that are outlined in the regulations in terms of evaluating their safety performance and their overall performance?

THE WITNESS: That's correct. We are looking at a lot of different areas. We are looking at manual

procedures, we do cockpit in routes, we do ramp checks, we do cabin in routes. We review the training programs, the Check Airmen. We watch the PC's that take place on line captains and we watch the designees, so there is a whole different realm, a large area that we take a look at.

CHAIRMAN HALL: I wanted to get into that in a little detail because I think one of the witnesses mentioned, you know, and I think all of us indeed can point that this is an extremely, airline safety in this country is extremely safe and it is safe because over the years, you know, a system has been put in place that has brought about a high level of safety. But that work continues and you indicated that the appointment of the General, that there has been some restructuring within USAir in terms of their safety operation. How does that impact you in your role?

THE WITNESS: Well, for the most part I have had a very good relationship with the safety department, so that under normal conditions, I would deal directly with the Director of Safety and not with General Oaks.

There are those situations, the General mentioned ground safety. Well, there are those incidents that take place that involve not only a

flight crew but ground personnel as well. And so it is going to make it much easier to get involved in some of these other areas of safety that involve maybe a mechanic and a pilot, or a mechanic and a utility person that is pushing back an airplane. So when these incidents come up, we can, we will have a form to go through to deal with it.

CHAIRMAN HALL: Have you had a meeting with General Oaks, have you sat down and met with him yet?

THE WITNESS: Yes, sir.

CHAIRMAN HALL: On how many occasions?

THE WITNESS: Three or four different occasions.

CHAIRMAN HALL: Good. Does anyone else have questions for this witness?

If not, Mr. Bowden, you are excused. Thank you very much for your testimony.

(Witness excused.)

CHAIRMAN HALL: At this point I would like to ask Mr. Haueter, I believe he has furnished to all the parties a list of action items that have been identified that need to be accomplished. I would like to ask Mr. Haueter to go through those action items. And to the extent that we can specify a time period in which we all will work to have that item completed, I

would like to make note of that.

Mr. Haueter.

MR. HAUETER: Thank you, Mr. Chairman.

These are actions items that have been developed during the public hearing. First, do all parties have a copy? Is the wake vortex flight test using the FAA 272 and a Boeing provided bailed 737. This will be a FAA-Boeing-NTSB activity. Tom Jacky, the Performance Group will be working on that group. An exact date, I would expect within the next two months.

Any of that parties --

CHAIRMAN HALL: We expect to have that work accomplished within 60 days?

MR. HAUETER: We will certainly try, sir. Depending, we will have to make some arrangements on aircraft crews and things like that.

CHAIRMAN HALL: I understand what we are try to do here is set a goal for ourselves and we may -- but let's all at least have a goal and a deadline to work to on each one of these.

MR. HAUETER: Okay.

CHAIRMAN HALL: Okay.

MR. HAUETER: The next item is on the Critical Design Review Team, the letter, their charter

letter, FAA. Do you have a goal when you might --

MR. DONNER: Next week.

MR. HAUETER: We will have that next week I understand.

Next is the Critical Design Review Team's final report from the FAA.

CHAIRMAN HALL: John had a question.

MR. HAUETER: I'm sorry. John.

MR. PURVIS: What date?

MR. HAUETER: No. 2 is the charter letter for the Critical Design Review Team.

I can't hear you, sir.

MR. PURVIS: What was the date?

MR. HAUETER: Next week they said they would provide it.

And for the final report from the CDR Team?

MR. DONNER: March 31st.

MR. HAUETER: March 31st for the final report.

CHAIRMAN HALL: Okay. That's the Critical Design Review Team final report March 31st.

MR. HAUETER: Yes. From Boeing is the further refinement of the FDR back drive data for USAir Flight 427.

Mr. Purvis, when do you think that might be

accomplished?

MR. PURVIS: Two months.

MR. HAUETER: Two months, 60 days.

CHAIRMAN HALL: Thank you.

MR. HAUETER: Further refinement of the FDR kinematic study for USAir Flight 427, a Boeing activity?

MR. PURVIS: We are giving you very tight numbers, I don't know if we can meet them, but another, we'll take two months on that one too.

MR. HAUETER: Okay. Flight recorder, flight data recorder information from all post-accident flight tests conducted by Boeing?

MR. PURVIS: Two weeks.

MR. HAUETER: Two weeks. Plots of the flight data recorder data or quick access recorder data from any or all Air France incidents or yaw damper occurrences, that's both Boeing and NTSB.

MR. PURVIS: We'll have that next week.

MR. HAUETER: Next week.

MR. PURVIS: Yeah.

CHAIRMAN HALL: Seven days?

MR. PURVIS: Seven days. Yeah, we have to get some cleaned up copies.

MR. HAUETER: Okay.

MR. PURVIS: Okay. For us it is only, we don't have the QAR data, we have just the flight recorder data.

MR. CLARK: Chairman Hall.

CHAIRMAN HALL: Yes. Mr. Clark. Can we have this microphone, please, for Mr. Clark?

MR. CLARK: Mr. Jacky is at this moment in the process of gathering QAR data. We expect it to be arriving at Dulles sometime this afternoon and we will be making arrangements with the Penny and Giles people who manufacture the QAR type recorder to further process the data.

So we are going to proceed ahead. We are not sure, it is happening rapidly, how we are going to pull all the groups together, but we are proceeding ahead and I am sure we will get the groups pulled together as quickly as possible.

CHAIRMAN HALL: Very well.

MR. PURVIS: So what is our action, the Boeing action on this one then?

MR. CLARK: Right now I can't tell you what our action is going to be because we have got to get the tape. We are unsure of the format the tape is going to be in. We are going to try to get to a Penny and Giles facility, there are some here in the country.

And if we can start getting data out, then we will be better able to advise you on what assistance we need.

MR. PURVIS: Okay. I think what we can do is just support Mr. Clark.

CHAIRMAN HALL: That is really just our action, right, John?

MR. CLARK: Yes.

CHAIRMAN HALL: Once they give us the data, is there anything else we need to do, we need Boeing to do?

MR. CLARK: We don't need necessarily Boeing or any of the other parties to do anything, but we do try to conduct all of these in the party arrangement where they each have a representative available and we will proceed as quickly as we can. And we do that routinely. We will be making progress and then get the parties together at an appropriate time.

CHAIRMAN HALL: Well, we are the responsible party in this item, so when do we think, let's put a time frame on it we think we can complete that. Thirty days?

MR. CLARK: Thirty days.

MR. HAUETER: Yes, sir.

CHAIRMAN HALL: Okay.

MR. HAUETER: But I guess the key, one of the

issues, Boeing will provide us their data in seven days, then we will also proceed with this, the plots that they have on hand.

MR. CLARK: Yes, Boeing has provided us some plots already. They are going to search their files, provide us the rest of the data that they may have in their archives and then we are proceeding with the raw data.

MR. HAUETER: The next item is any back drive kinetic study of the FDR data from incidents, accidents related to USAir Flight 427 from Boeing.

CHAIRMAN HALL: Mr. Purvis, can you help us with the data on that one or a time frame?

MR. PURVIS: What is it you, other than what is said there, do you have any specifics of what you are looking for?

MR. HAUETER: Just get it from John. Mr. Clark, who is --

MR. PURVIS: We have no kinematic studies I am told, on the other accidents.

CHAIRMAN HALL: Could we please have Mr. Clark's microphone?

MR. CLARK: Part of the request was to explore some of the upsets, specifically Colorado Springs, and we recognize there's serious limitations

in that data, but to explore the possibility of using the kinematic approach to examine the data we do have. So that is one area. And then there may be some validation on other -- one kinematic area that would be of interest, for example, possibly looking at the QAR data to validate the kinematic approach for examining rudder output. But that is ill-defined at this time and I am not sure we can put a number on all of that.

MR. PURVIS: I am not sure we can put a number on it either. It depends on what kind of data we have and how many incidents we are looking at.

MR. CLARK: Yes.

CHAIRMAN HALL: Well, surely within 90 days we would know whether we have anything or not, right?

MR. PURVIS: Yes, sir.

CHAIRMAN HALL: Put 90 days on that item.

MR. HAUETER: Next on the list is the list of Boeing recommended flight data recorder parameters and sampling rates.

CHAIRMAN HALL: That is the letter that was distributed yesterday to all the parties in regard to the flight data recorders. I have been advised that February 3rd may be a difficult data to meet, is that correct?

MR. PURVIS: It is going to be tough for us.

It turns out, by the way, that airplanes going out the door today have something in excess of a hundred parameters. We said 31.

CHAIRMAN HALL: Well, I want to get a, I want to get the Board's quick attention to this subject matter. However, we have heard from other manufacturers and other, and I think we would like to get the input from the Airline Transport Association. So let's make the date of that February 15th.

Or let's make it February 14th and that will be our Valentine's Day present to the people Let's say February 14th.

Okay. Mr. Haueter.

MR. HAUETER: Next is the simulator study of the body effects on wake turbulence vortices for the Boeing 737. It's a Boeing plane activity.

MR. PURVIS: Sixty days, two months.

CHAIRMAN HALL: Sixty days on that item.

MR. HAUETER: Next is, for us it is the Honeywell tilt-table studies. Mr. Jacky.

MR. JACKY: The tentative date is March 2.

MR. HAUETER: March 2nd is the tentative date for them.

CHAIRMAN HALL: Okay, March 2nd.

MR. HAUETER: The copied voice recorder

background noise, flight test work and spectrum analysis, NTSB, Boeing. I suspect that within 60 days, sir. Mr. Jim Cash is working on that.

CHAIRMAN HALL: Okay, 60 days on that item.

MR. HAUETER: From Boeing, the number one slot deployment wind tunnel aerodynamic study.

MR. PURVIS: Sixty days.

CHAIRMAN HALL: Sixty days. Thank you.

MR. HAUETER: From Boeing, the report on the reporting process action taken on customer service incidents, service difficulties and how service information is processed through Boeing, including a description of the ASAP and the AIR programs.

MR. PURVIS: That, I think I would combine that with the one of the middle of the page, organization diagram and full description of air safety data reporting system. They are similar things, and we will combine those and do it in a month.

MR. HAUETER: Thirty days?

MR. PURVIS: Yeah.

CHAIRMAN HALL: Thirty days, thank you.

MR. HAUETER: Report on Boeing 747, elevator PCU chip-shear test to clear up the discrepancy between recent chip-shear tests that showed marks versus page six of Exhibit 9-A-D that cites previous Boeing tests

which indicated no marks from hard materials.

MR. PURVIS: One week.

MR. HAUETER: One week. The report on Boeing 737 rudder involved upsets, in terms of the numbers of upset reports.

MR. PURVIS: We are not really sure where that one came from. Specifically, what is it? Is it a review of that list of 187 items or what?

MR. HAUETER: A list of that and also looking at the other data bases within Boeing to see if there's other ones that were not reported in that list.

CHAIRMAN HALL: Any additional reports that Boeing has gotten, whether they made it under that category or didn't make it under that category, that might be something we want to look at.

MR. PURVIS: See, the problem is this, well, we had the discussion yesterday on data bases and whether things were in the data base. That one item that kicked it off was the Air France item, which turned out was properly not in that data base.

CHAIRMAN HALL: John, what we are trying to do here, and I am going to make a clarification as soon as we finish this list, on some reports on yesterday's activities. But what we want to do is to have you go look, as Mr. McGrew and I discussed yesterday, into

every crack, and if there is anything that looks like -- it looks like a duck, you know, let's bring it up, whether it is, the computer is a duck or not.

MR. PURVIS: It is a big job. We are having a debate whether we can do it in 60 or it is going to take 90.

CHAIRMAN HALL: Let's say 90 days.

MR. PURVIS: Ninety days, yeah.

CHAIRMAN HALL: Okay.

MR. PURVIS: A lot of that is going to be manual, unfortunately.

CHAIRMAN HALL: I understand.

MR. HAUETER: We combined the next item down. Following is a complete, full dimensional checks of the rudder PCU and several valves, NTSB, Boeing. Mr. Phillips tell me that can be done in 30 days.

CHAIRMAN HALL: Thirty days. Thank you.

MR. HAUETER: Complete maintenance history of the PCU from Flight 427, that's USAir and Parker might need a little help on that.

CAPTAIN SHARP: Seven days is plenty for us. We have already --

CHAIRMAN HALL: How many?

CAPTAIN SHARP: Seven days is plenty for us. We have already got the record.

MR. HAUETER: And from Parker --

CHAIRMAN HALL: Seven days. Did I miss the complete, full dimensional checks of PCU's?

MR. HAUETER: No, we -- that's one we just mentioned previously. The 30 days. The organizational diagram.

CHAIRMAN HALL: It's been a long week. I just didn't hear that. Okay. Go ahead.

MR. HAUETER: And from Parker, how long do you think we can get the records on that PCU?

MR. WEIK: It is under my understanding it has already been submitted. I thought that was part of the public docket here. So I don't know if we already have it. But we can resubmit it with a week.

CHAIRMAN HALL: We are talking about the complete -- which one are on now, Tom?

MR. HAUETER: The complete maintenance history of the PCU from Flight 427.

MR. WEIK: We can resubmit it within a week.

MR. HAUETER: We'll check that, have it within seven days. We may already have it.

CHAIRMAN HALL: Okay.

MR. HAUETER: The Sahara Airlines Boeing 737 accident data to be entered into the public record. The data that NTSB and Boeing has, we will combine that

and put into the public docket. That we should be able to complete I would think in 30 days.

CHAIRMAN HALL: Okay.

MR. HAUETER: And finally the viewgraphs used by George Green to be entered into the public docket.

MR. GREEN: Monday.

MR. HAUETER: We'll do that on Monday I understand.

CHAIRMAN HALL: Okay. Those other little miscellaneous items that we had discussed that are going to be entered in the docket, I don't think they need to be part of this list, but we just need to be sure they are all there and available.

MR. HAUETER: I would like to point out this list is what we picked up during the public hearing. There are still activities that will be going on by the various groups, particularly Performance and Systems, that are included here, but I think we should be able to conclude those within a 90 day time frame.

CHAIRMAN HALL: Okay.

MR. PURVIS: Mr. Chairman.

CHAIRMAN HALL: Yes, sir.

MR. PURVIS: One quick question. Maybe this falls in the miscellaneous category, maybe Mr. Leonard can answer it.

One of the dockets, or one of the exhibits in the docket, 2-A-1, which was an appendice to the Operation Group Factual Report, talked about, I think it was crew training records, and they are not in here yet. Do you know when they will be available?

It is Appendices A through Q. It says just to be available at a later date.

MR. LEONARD: Yes.

CHAIRMAN HALL: Could you please get Mr. Leonard's microphone, please?

MR. LEONARD: Yes, John, they should be available fully, put on our system within seven days, sir. They will be available.

MR. HAUETER: That's all the action items I know of at this time, sir.

CHAIRMAN HALL: Mr. Haueter, it is my understanding that you will continue, beginning next Wednesday, with your weekly conference calls with the parties, is that correct?

MR. HAUETER: If the parties wish it, the last few weeks have been dying off, but that certainly can be arranged, sir.

CHAIRMAN HALL: Okay. Well, if you would start it again, I would appreciate it.

MR. HAUETER: Okay.

CHAIRMAN HALL: See if we can't proceed.

MR. HAUETER: We'll have to get with the Boeing people and arrange the number again and what is happening there.

CHAIRMAN HALL: Okay. Are there any other comments from any of the parties to this investigation?

Yes, sir.

MR. PURVIS: Are you going to talk about my concern over the data?

CHAIRMAN HALL: I am going to address that in just a minute.

MR. PURVIS: Okay. Thank you.

CHAIRMAN HALL: Are there comments from the Technical Panel?

MR. HAUETER: No, sir.

CHAIRMAN HALL: Are there comments from any of the individuals up here? Mr. Marx, Mr. Schleede, Mr. Clark, Mr. Laynor?

(No response.)

CHAIRMAN HALL: Very well. It has been brought to my attention by Mr. Purvis that some of the characterizations of yesterday's hearing inferred that, in looking here at one headline, that there is a possibility that the Chairman felt that data had been withheld by the Boeing corporation. I want to clarify

that that is not the opinion of the Chairman.

It was the opinion of the Chairman there was a miscommunication in terms of our request for the data. But the Chairman wanted to be sure that all of the data that might be of assistance to us in this investigation, as Mr. McGrew and I talked about, and I think we refer to that as kind of looking in every crack, that we went back and looked in every crack.

I didn't have a basic understanding of how your process, yesterday, of how you put your information in your computer. But we know the incident that occurred, at least with your assistance we have a better understanding, and the parties' assistance, of what occurred. We need to be sure that anything in the very long and very successful history of this aircraft that might be there that might lead us in the proper direction to find the probable cause of this accident, that we have exhausted that.

So I regret that we have had a mischaracterization of what took place and I hope that that will correct it.

Let me say to all the parties that, while I greatly appreciate your assistance in this investigation, and we all are aware that without your assistance, and the dollars and cooperation that you

have expended, that there is no way that the National Transportation Safety Board, with our own resources, could undertake an investigation of this magnitude.

However, having said that, it is also clear that the American people look to the National Transportation Safety Board to ensure that this is an independent investigation and that it is as thorough and complete an investigation as can be accomplished, and that we make a full report to the American people.

In closing, I want to emphasize that this investigation will remain open to receive, at any time, new and pertinent information concerning the issues presented. The Board may at its discretion, reopen the hearing in order that such information may be made a part of the public record.

The Board welcomes any information or recommendations from the parties or the public which may assist in its efforts to ensure the safe operation of commercial aircraft. Any such recommendations should be sent to the National Transportation Safety Board, Washington, D.C. 20594, to Mr. Thomas Haueter's attention.

Normally, they should be received 30 days after the receipt of the transcript of this hearing. However, since there are still investigation activities

open in this case, many of which we have just reviewed, Mr. Haueter will notify the parties when the final submissions are due.

All the evidence developed in this investigation and hearing, and all recommendations received within the specified time, will be presented and evaluated in the final report on USAir Flight 427 in which the National Transportation Safety Board's determination of the probable cause will be stated.

On behalf of the National Transportation Safety Board, I want to thank again the parties for their cooperation, specifically the Boeing Commercial Airplane Group, Parker Hannifin Corporation, the Airline Pilots Association, USAir Incorporated, the Federal Aviation Administration, the International Association of Machinists and the Monsanto Company. And I want to thank you not only for your patience during this proceeding but your assistance throughout the entire investigation.

And I want to express since appreciation to all those groups, persons, corporations and agencies who have provided their talents so willingly throughout this hearing. And I would be remiss if I did not mention at this time the people of Pittsburgh, specifically, the emergency responders and individuals

who assisted at the scene of this accident and assisted us so ably in trying to do the reconstruction of the aircraft which was shown to the press yesterday.

The record of the investigations, including the transcript of the hearing and all exhibits entered into the record, will become part of the Safety Board's public docket on this accident and will be available for inspection by the public at the Safety Board's Washington office. Anyone wanting to purchase the transcripts may contact the court reporter directly. Remember, this includes the parties who must order their own transcripts.

I wish to acknowledge the attendance at this hearing of a number of family members of the victims in this accident. I had what I thought was a fruitful meeting with you early this week, explaining the role of the Board in this investigation, and we were able to arrange a tour of the hangar for you yesterday.

I trust that you have come to appreciate our commitment to take all the information we have learned here, in addition to the thousands of pages of exhibits we have already compiled, back to Washington to determine the cause of this accident and to develop safety recommendations that will hopefully prevent such an accident in the future. We do this on your behalf,

on behalf of the American people, and on behalf of the worldwide aviation community.

Yesterday I sent a letter to all the parties requesting their assistance in evaluating the best ways to improve the data recording capabilities on thousands of airliners that have, what we consider inadequate flight data recorders. We asked the parties not only to tell us what parameters would be the most vital to retrofit, but also to evaluate the practicality of video type recorders as well. I have asked for this information by February 14th so the Board can begin evaluating this issue and make a possible recommendation as soon as possible.

While much of the testimony at this hearing centered on the operation of the aircraft's rudder system, the Board will continue to pursue many avenues of inquiry in our search to solve this highly complex and difficult investigation. Later this year the entire Safety Board will consider a final report on this accident during a meeting open to the public at our headquarters in Washington, D.C.

I now declare this hearing to be in recess indefinitely.

(Whereupon, the hearing was recessed sine die.)