UNITED STATES OF AMERICA

NATIONAL TRANSPORTATION SAFETY BOARD

In the matter of:	*	
	*	
INVESTIGATION OF THE ACCIDENT	*	
INVOLVING UPS AIRLINES FLIGHT 1354,	*	
AIRBUS A300-600, REGISTRATION N155UP,	*	Docket No.: DCA-13-MA-133
ON AUGUST 14, 2013, ON APPROACH TO	*	
BIRMINGHAM-SHUTTLESWORTH	*	
INTERNATIONAL AIRPORT,	*	
BIRMINGHAM, ALABAMA	*	
	*	

NTSB Board Room and Conference Center
429 L'Enfant Plaza, S.W.
Washington, D.C. 20594

Thursday,
February 20, 2014

The above-entitled matter came on for hearing, pursuant to Notice, at 8:30 a.m.

BEFORE: NTSB BOARD OF INQUIRY

APPEARANCES:

NTSB Board of Inquiry

DEBORAH A.P. HERSMAN, Chairman
CHRISTOPHER A. HART, Vice Chairman
ROBERT L. SUMWALT
MARK R. ROSEKIND, Ph.D.
EARL F. WEENER, Ph.D.

NTSB STAFF

JOHN LOVELL, Hearing Officer
DAN BOWER, Ph.D., Investigator-in-Charge

Technical Panel

ROMAIN BEVILLARD, Bureau d'Enquetes et d'Analyses (BEA)
DAN BOWER, Ph.D., Senior Aviation Accident Investigator, Major Investigations Division, Office of Aviation Safety, National Transportation Safety Board (NTSB)
DAVID LAWRENCE, Captain, Senior Aviation Safety Investigator, Operational Factors Division, Office of Aviation Safety, NTSB
DANA SCHULZE, Deputy Director, Office of Aviation Safety, NTSB
KATHERINE WILSON, Ph.D., Senior Human Performance Investigator, Office of Aviation Safety, NTSB

Interested Parties

ROBERT DRAKE, Federal Aviation Administration (FAA)
CRAIG HOSKINS, Captain, Airbus
HOUSTON MILLS, Captain, United Parcel Service (UPS)
DAN PERSUIT, Transportation Workers Union (TWU)
STEVE WHYTE, Captain, Independent Pilots Association (IPA)

Witness Panel 1

MARK STEINBICKER, Manager, Performance-Based Flight Systems Branch, FAA
PETER LAURENTZ, Captain, Director of Training and Standards, UPS
DREW MIDDLETON, Captain, A300 Check Airman, IPA
MICHAEL KRIZ, Captain, A300 Standards Manager, Airbus

APPEARANCES (Cont.):

Witness Panel 2

LARRY PARKER, Captain, A330 Training Manager, UPS
ROBERT BURKE, Manager, Air Carrier Training Systems and Voluntary Safety Programs Branch, FAA
JON SNYDER, Captain, Representative of Fatigue Working Group, UPS
LAURI ESPOSITO, First Officer, Representative of Fatigue Working Group, IPA
TOM CHIDESTER, Ph.D., Research Psychologist, FAA

Witness Panel 3

JOHN HEINLEIN, Air Safety Inspector (Dispatch), FAA
JEFF CHESTNUT, Flight Dispatch Manager, UPS
GORDON ROTHER, Headquarters, Air Safety Inspector (Dispatch), FAA
MATTHEW AMESBURY, Flight Dispatch Trainer, TWU

I N D E X

I N D E X (Cont.)

I N D E X (Cont.)

P R O C E E D I N G S

(8:30 a.m.)

CHAIRMAN HERSMAN: Good morning. I am Debbie Hersman, Chairman of the National Transportation Safety Board, and it is my privilege to welcome you to the NTSB's Board Room. I am joined today by my fellow colleagues: Vice Chairman Chris Hart, Member Earl Weener and Member Mark Rosekind; Member Robert Sumwalt is also here with us today, and he served as the spokesperson for the investigation while we were on scene in Birmingham.

Today, we hold a hearing on the August 14, 2013 crash of a United Parcel Service (UPS) Flight 1354 in Birmingham, Alabama, which resulted in the deaths of two commercial pilots. On behalf of my fellow Board Members and the entire NTSB staff, we offer our deepest condolences to the family and friends who lost loved ones in this crash. We are joined in the Board Room today by several family members and friends of the crew, and an additional number are watching via webcast. We know that this will be a difficult day for you. We cannot change what happened, but we do have the opportunity to learn everything we can about this accident to prevent future occurrences.

While airline accidents are rare events, they are widely publicized and closely scrutinized by experts around the globe. When an accident such as this occurs, it is the responsibility of the National Transportation Safety Board, with assistance from designated parties from government, industry, labor, to understand

what happened, why it happened, and how we can prevent similar accidents from reoccurring.

The purpose of this hearing is twofold. First, the issues that will be discussed at this hearing serve to assist the NTSB in developing additional factual information that will be analyzed for the purposes of determining the probable cause of this accident. And second, this hearing also provides an opportunity for the aviation community and the public to see a portion of the total investigative process. This transparency reinforces our role as an independent agency and provides an opportunity for citizens to view the efforts being put forth by investigators in determining the cause of this accident.

I want to assure the families of the crew that the NTSB will pursue every lead toward what caused or contributed to this accident. We will also fulfill our broader mandate to formulate recommendations to prevent tragedies not only in the U.S. but worldwide.

Public hearings such as this are exercises in accountability: accountability on the part of the NTSB that it is conducting a thorough and fair investigation; accountability on the part of the FAA that it is adequately regulating the industry; accountability on the part of the airline that it is operating safely; accountability on the part of manufacturers as to the design and performance of their products; and accountability on the part of the workforce, including pilots and mechanics, that

they are performing up to the high standards of professionalism expected of them.

During this investigation, the NTSB is working closely with our French counterpart, the BEA, and I wish to welcome Mr. Romain Bevillard, who is serving as the accredited representative of the BEA as provided by Annex 13 of ICAO.

On August 14, 2013, at about 4:47 Central Daylight Time, UPS Flight 1354, an Airbus A300-600, Registration Number N155UP, crashed short of Runway 18 while on approach to Birmingham-Shuttlesworth International Airport in Alabama. The two flight crew members were fatally injured and the airplane was destroyed. The cargo flight was operating under Title 14 Code of Federal Regulations Part 121, and originated from Louisville International Airport in Kentucky.

Last week, on February 13, 2014, the NTSB conducted a prehearing conference for the NTSB's personnel and parties to this hearing. At that prehearing conference, we identified the issues to be discussed at this hearing and identified and agreed upon the list of witnesses and exhibits. The three broad issues that we will discuss today are: first, non-precision approaches; second, human factors; and third, flight dispatch. Testimony and questioning will be limited to these three issue areas.

Before proceeding, I'd like to identify the NTSB staff members who are part of this hearing: Dr. Dan Bower, the Investigator-in-Charge; Mr. John Lovell, the Hearing Officer. Our

technical panelists include Dr. Katherine Wilson, Captain David Lawrence, and Dana Schulze, all of the NTSB, and from the BEA, Mr. Romain Bevillard. Additional support is being provided by Eric Weiss, Public Affairs; David Tochen, Robert Combs, and Alex Burkett, who are providing legal support; Brian Soper and Don Eick, who are assisting with audio/visuals.

Thank you to everyone who I've mentioned, and also the NTSB employees who have worked tirelessly behind the scenes. We have a new docket system. I know we had employees who were working until the wee hours of the morning trying to make sure that all of the materials were up and available for the public and the parties. So, thank you to everyone who has been working hard to make this hearing possible.

I will now introduce the parties designated to participate in the investigative hearing. As prescribed by the Board's rules, we designate as parties those persons whose participation we deem will contribute to the development of pertinent evidence. As I call the name of each party, I will ask the designated spokesperson to identify themselves, state their affiliation with the party, and introduce the other persons at the table. Remember, you need to press the button on your mic and speak directly into the microphone. We'll begin with Airbus, Captain Craig Hoskins.

CAPT. HOSKINS: Good morning, Madam Chairman. Airbus would like to express its condolences, as well, to the family and

the friends of the flight crew. This morning, at our table we have myself, the Vice President of Safety and Technical Affairs. Next to me is Mr. Yannick Malinge, our Senior Vice President of Product Safety; Mr. Nicolas Bardou, Air Safety Investigator; Captain Dominique Deschamps, Vice President of Flight Ops and Training Support; Captain Erik Vannier, Flight Training Manager for the A300; and Captain Rudy Canto, Director of Safety and Technical Affairs. Thank you.

CHAIRMAN HERSMAN: Thank you, Captain Hoskins.

We will now move to the Federal Aviation Administration, Mr. Robert Drake.

MR. DRAKE: Good morning, Madam Chairman. Bob Drake with FAA's Office of Accident Investigation, and with me I have Bob Hendrickson, also with the Office of Accident Investigation, our on-scene investigator; Dr. Tom Chidester with the Office of Aerospace Medicine; Brooke Lewis with our General Counsel; and Mark Steinbicker with Flight Standards. Thank you.

CHAIRMAN HERSMAN: Thank you, Mr. Drake.

Now we'll move to the Independent Pilots Association, the IPA, Captain Steve Whyte.

CAPT. WHYTE: Thank you, Madam Chairman. Good morning. The IPA would also like to extend our condolences to the family and friends of Flight 1354.

My name is Captain Steve Whyte. I'm the party coordinator. To my right is Captain Joe Bianco, A300 Check Airman

and Systems Group member. Across from me is First Officer Mike DeLuise, Co-Chairman of the Accident Investigation Committee. And next to him is A300 Captain Mike Brickner, member of the Structures Group. Thank you.

CHAIRMAN HERSMAN: Thank you.

Transport Workers Union, TWU, Mr. Dan Persuit.

MR. PERSUIT: Good morning, Madam Chairman. We also would like to offer our condolences to the families of UPS 1354.

My name is Dan Persuit. I am a dispatcher representing the Transport Workers Union of America. I have Mike Conner, who is a dispatcher at Southwest Airlines; Rich Edelman, representing TWU; Brian Whitsman, dispatcher from UPS; and Alex Giarrocco from Spirit Airlines. Thank you.

CHAIRMAN HERSMAN: Thank you, Mr. Persuit.

United Parcel Service, or UPS, Captain Houston Mills.

CAPT. MILLS: Thank you, Madam Chairman. Captain Houston Mills, UPS Airlines, Director of Safety.

First of all, let me start by saying Flight 1354 was a terrible tragedy, and our thoughts and prayers continue to be with our lost pilots -- Captain Cerea Beal and First Officer Shanda Fanning -- and their loved ones.

Across from me is Captain Reed Potecha, the UPS Party Coordinator; Scott Casey, UPS Airlines Vice President and General Counsel; Larry Ashby, Captain Larry Ashby, a UPS representative to the Operations and Human Performance Investigation Groups;

Captain Chris Williams, UPS Director of Operations; and Mr. Gary Halbert, outside counsel to UPS. Thank you.

CHAIRMAN HERSMAN: Thank you, Captain Mills.

I'd like to thank all of the parties for their assistance and cooperation with the NTSB's investigation thus far.

We will begin the hearing with a presentation by the Investigator-in-Charge, Dr. Dan Bower, who will provide an overview of the crash. We will then proceed in sequence, one panel at a time, for each of the three hearing issue areas. For each hearing panel, the Hearing Officer, John Lovell, will call and introduce the witnesses, and each will testify under oath. The witnesses have been prequalified, and that means their qualifications and biographical information are available on the NTSB's website for our review.

The witnesses will be questioned first by the NTSB's Technical Panel seated to my right, then by the spokespersons that we just introduced for each of the parties, and then finally by the Board of Inquiry, which consists of the five Board Members. The parties will be limited to 5 minutes per panel. After one round of questions, due to time constraints, a second round will be limited to pertinent questions that serve to clarify the record or address some new matter raised.

I must emphasize again the fact-finding nature of the hearing. NTSB investigations are, by regulation, fact-finding proceedings with no adverse parties. The Board does not assign

fault or blame for an accident or incident.

At this hearing, witnesses may not analyze or speculate, and questions are limited to the predetermined subject matter of the hearing, which is contained in the hearing agenda. Questions relating to fault, outside litigation, legal liability will not be permitted. And I'd like to take this moment to also remind the parties that this is not just about what takes place in this hearing room, and I would provide a caution to you and everyone on your team about engaging with the media in analytical statements. Take this as your warning. If we see any of that taking place, we do have the ability to remove parties from the investigation. I do not want to see any further speculation in the media. It's about protecting all of you and sticking to the facts.

Some exhibits include markings, redactions. These reflect the NTSB's agreement with the providers of the documents regarding the NTSB's disclosure of any proprietary or confidential information in these exhibits. The NTSB is authorized by statute to disclose information to carry out its duties, but we attempt to do so in a way that protects confidentiality to the greatest extent possible.

At this time I will call on the Hearing Officer, Mr. John Lovell, to go over a few items. Mr. Lovell.

MR. LOVELL: Thank you, Madam Chairman. Good morning, everyone. In the event of a fire alarm, there are three ways to exit the Board Room. There's an exit to the street located

directly beyond the doors where you enter the Board Room, and there are exits on either side of the Board Member podium. If an emergency arises and someone needs emergency attention, please notify one of the security guards at the entrance to the Board Room.

Today, our first break will begin at 10:15, and because of our full schedule, breaks will be for 15 minutes. We will have an hour lunch break around 11:30 a.m. and an afternoon break around 3 p.m. We plan to conclude the hearing by 5:30 p.m.

Regarding microphones, when speaking, be sure to move the microphone close to you and switch it on by pressing the small button at its base. Be sure to switch the microphone off when you are finished speaking to prevent interference.

When speaking, also, annunciate clearly, speak slowly, and make your questions short and concise to ensure optimal sound and quality for the broadcast.

As far as exhibits are concerned, exhibits are entered into the record, and any slides, along with other records of the investigation become part of the NTSB's docket and are available via the NTSB website, www.ntsb.gov.

A transcript of the testimony taken during the hearing will be prepared and entered into the docket as soon as practicable.

Parties will have the opportunity to submit proposed findings of fact, conclusions, and recommendations to the Board of

Inquiry after the close of the hearing. Submissions will be made part of the public docket and will receive careful consideration during the Board's analysis of the evidence and preparation of the final report. I encourage the parties to make use of this opportunity. Please note that submissions must be sent to the NTSB within 30 calendar days of today's date and copies must be provided to each of the parties of the hearing.

The hearing transcript should be available to the parties by February 27, 2014.

Madam Chairman, that is all I have at this time.

CHAIRMAN HERSMAN: Thank you, Mr. Lovell. Are we ready to call and swear in our first witnesses?

MR. LOVELL: Yes, we are, Madam Chairman.

CHAIRMAN HERSMAN: Oh, Dan, Dr. Bower, please proceed with your presentation, and then we will bring the witnesses up.

DR. BOWER: Thank you, Madam Chairman.

Thank you, Madam Chairman, Members of the Board. This presentation will provide an overview of some of the pertinent facts obtained in the investigation; however, all should be reminded that the entire record of factual information collected to date is contained in the public docket for this investigation.

UPS Flight 1354 was a cargo flight from Louisville, Kentucky, operating under the provisions of 14 C.F.R. Part 121. The airplane was scheduled to arrive at Birmingham-Shuttlesworth International Airport at 0450 local time. The weather reported to

the crew at the time of arrival was broken clouds at 1,000 feet above the ground, overcast at 7500 feet, with calm winds and 10 miles visibility. The captain was the pilot flying, and the first officer was the pilot monitoring.

Runway 624 at Birmingham, which utilizes an instrument landing system, was scheduled closed for repairs between 0400 and 0500 local time, and the flight was dispatched with a planned approach to Runway 18. The captain briefed the localizer approach to Runway 18 about 24 minutes before the accident, while the airplane was level at 28,000 feet.

The localizer Runway 18 approach to Birmingham Airport is a non-precision approach. Lateral guidance for the approach is provided from the airport by means of a localizer, and because the approach does not have ground-based vertical guidance, the crew briefed and prepared for the vertical guidance to be provided by the flight management computer on the airplane by means of a computer-generated flight path angle.

The following charts describing the accident sequence of events will display the path of the aircraft vertically and distance north of the airport. In this orientation, the runway threshold is located in the lower right corner of the chart.

Runway 18 vertical guidance at Birmingham is defined by three approach fixes aligned north along the extended runway centerline, named: Colig, Baskin and Imtoy. Each of these fixes have a minimum crossing altitude associated with them. The final

decision altitude, which is the minimum altitude for deciding whether to commit to land or to go around, was at 1200 feet mean sea level, or about 500 feet above the airport ground elevation, and occurs after Imtoy, located 2 miles north of the Runway 18 threshold. The locations and minimum crossing altitudes at Baskin and Imtoy also define the desired descent path of 3.28 degrees. This descent path should be flown while utilizing the profile method for the approach which was briefed by the flight crew.

These approach fixes, minimum altitudes, and descent path will be displayed on the next several slides. Also, the status of the autopilot, the selected altitude or vertical speed value will be shown in the brown box in the upper right corner. As I move through the sequence of events, the scale of the chart will be enlarged as the aircraft descends closer to the runway.

The flight was descending through 6900 feet with the autopilot engaged when it was cleared by air traffic control for the approach to Runway 18, and was instructed to descend and maintain 2500 feet altitude until established on the localizer. The autopilot was set to flight level change, with a selected altitude of 2500 feet. The landing gear had been lowered about 30 seconds prior to this clearance.

The flight was established on the localizer when the aircraft passed through 3800 feet and within 12 miles of Runway 18, and was aligned laterally with the centerline of the runway for the remainder of the flight.

When the aircraft was at an altitude of about 2500 feet, an airspeed of 213 knots, and about 9 nautical miles from Runway 18, the autopilot mode changed to altitude hold and maintained the value of 2500 feet. Note the minimum crossing altitude in this section of the approach between points Colig and Baskin is 2300 feet.

About 6 miles from the runway, the selected airspeed was changed to 137 knots, which is the proper approach speed for this landing, and the aircraft began to slow to obtain this speed. The selected airspeed remained at this value for the remainder of the FDR recording.

ATC cleared the flight for landing on Runway 18 about 5½ miles from the runway, and the first officer began the landing checklist. At this point the slats and flaps were configured for landing.

As the aircraft approached the final approach fix, Baskin, the captain changed the autopilot mode to vertical speed mode. There was no verbal indication of this change to the approach procedure by the captain. At this point the aircraft was above the desired flight path angle of 3.28 degrees, as indicated by the black line.

The chart has now changed scales to the area closer to the runway, and the terrain below the flight path is indicated. The selected vertical speed was initially set to 700 feet per minute 7 seconds after entering vertical speed mode. Nine seconds

later, the first officer completed the landing checklist.

At this point the captain increased the vertical speed to 1,000 feet per minute. About 10 seconds after the first officer had completed the landing checklist, she makes a comment regarding the vertical speed mode, to which the captain responded, "I'm going to do vertical speed. He kept us high." The captain then increased the vertical speed to 1500 feet per minute.

As the aircraft passed through 1500 feet and was approaching Imtoy, the first officer made the thousand-foot callout, which refers to 1,000 feet above the airport elevation, and the captain responded, "DA 1200," two seconds later. There were no further callouts by the flight crew relative to the decision altitude.

I've once again changed the scale of the charts to the area even closer to the runway, and the terrain again is depicted, along with the estimated cloud height at the time of the accident. The flight passed the fix Imtoy at close to the prescribed altitude of 1380 feet, but the aircraft continued to descend at 1500 feet per minute, the captain commented 2 miles after they passed Imtoy. The aircraft then passed through the minimum altitude of 1200 feet with no callout regarding minimum altitude by the flight crew.

As the plane descended down to 1,000 feet MSL, or about 200 feet above the local terrain, the ground proximity warning system alert sink rate was recorded on the CVR. One second after

the sink rate alert, the captain began to reduce the vertical speed, reaching 450 feet per minute 3 seconds later. Also at this time, the captain called the runway in sight, which was confirmed by the first officer, and the captain proceeded to disconnect the autopilot.

The autopilot disconnect was followed by the first impact with trees 1 second later. The FDR stopped recording after the first tree impact, but the CVR continued recording for the next 9 seconds and recorded a ground proximity warning system alert, "Too Low – Terrain," starting 1 second after the sound of first tree impact. This diagram shows the direction of the approach relative to the airport, the location of the initial tree strike, and the location of the main wreckage.

Surveillance video cameras based at the airport captured the fire associated with the impact of the airplane, as seen in the upper left side of this video still image. Also noticeable in the videos is the presence of clouds over the impact area. Information from these videos in correlation with the cockpit voice recorder timing of when the crew stated the airport was in sight indicated that the estimated cloud base as shown on the previous profile view slides was at about 350 feet above the airport elevation.

This overhead view shows the main impact area. In this view, the aircraft had entered from the right and the main body of the aircraft struck an upslope area that ruptured the fuel tanks

and ignited the fire. The final resting position of the major pieces of wreckage are identified. The investigation has not identified any anomalies with the airplane, airplane systems, or enhanced ground proximity warning systems prior to the impact.

The investigative hearing will consist of the following panels: Panel 1, execution of non-precision approaches, including initial and recurrent training, standard operating procedures and proficiency; Panel 2, human factors, including crew resource management and coordination, monitoring and crosschecking, and fatigue and fitness for duty; and Panel 3, dispatch procedures, to include training, roles and responsibilities of dispatchers and limitations of dispatch-related software.

Thank you, Madam Chairman. That completes my overview of the accident.

CHAIRMAN HERSMAN: Thank you, Dr. Bower.

Mr. Lovell, will you please introduce the panelists and swear them in?

MR. LOVELL: Yes, Madam Chairman, with your permission, I'd like the panel to move forward to their area. Panel 1. Thank you. Please be seated.

Madam Chairman, Witness Panel 1 is composed of the following individuals: From my left, nearest the Board of Inquiry, Mr. Mark Steinbicker, FAA; Captain Peter Laurentz, UPS; Captain Drew Middleton, IPA; Captain Michael Kriz, Airbus.

The NTSB Technical Panel is composed of, starting at my

right, Dr. -- correction, Mr. Romain Bevillard; Dr. Dan Bower; Dr. Katherine Wilson; Captain David Lawrence, panel lead for the first panel; and Ms. Dana Schulze.

I now ask that the witnesses please stand to be sworn.

(Witnesses sworn.)

MR. LOVELL: Chairman Hersman, these witnesses have been prequalified and their respective experience and qualifications appear in the docket as exhibits in Group 1. I now turn the questioning over to Captain David Lawrence.

CAPT. LAWRENCE: Thank you, Mr. Lovell. Good morning, Madam Chairman, Board Members.

Mr. Soper, if you would, cue up Exhibit 2-A, page 40, please.

Good morning, panel. If you would, start from -- with Mr. Steinbicker. If you would just introduce yourself and your title or position with UPS, please?

MR. STEINBICKER: Good morning. My name is Mark Steinbicker. I work as a manager within the Federal Aviation Administration, Flight Standard Service.

CAPT. LAURENTZ: Good morning. I'm Captain Pete Laurentz, UPS Flight Standards and Training.

MR. MIDDLETON: Good morning. My name is Drew Middleton. I'm an Airbus captain at UPS. I'm also an instructor on the aircraft, both in the simulator as well as the airplane.

MR. KRIZ: Good morning. My name is Michael Kriz. I'm

working for Airbus as a type rating instructor and examiner on Airbus 300.

CAPT. LAWRENCE: Thank you very much.

CHAIRMAN HERSMAN: If I could just remind all the panelists, you really need to pull the microphones close to you and speak directly in them, and speak loudly so everyone can hear you. Thanks.

CAPT. LAWRENCE: I'd like to start with Captain Middleton first. Earlier, Dr. Bower mentioned several methods to conduct the non-precision approach into Birmingham, mentioning the profile and vertical speed methods. My first question is does UPS train both methods for non-precision approaches?

CAPT. MIDDLETON: Yes, we do.

CAPT. LAWRENCE: Which is the preferred method and why?

CAPT. MIDDLETON: The profile method is the preferred method, and it's chosen that way because, like in the intro when Dr. Bower was talking about instrument landing system approaches, which we typically do the most, which provides vertical as well as lateral guidance, the profile approach does that for the crew members, so it is the one we prefer them to do for non-precision approaches.

CAPT. LAWRENCE: What type of guidance does UPS provide in training for their pilots to conduct these profile approaches?

CAPT. MIDDLETON: You mean aside from the training?

CAPT. LAWRENCE: Aside from the training, manuals or

study material?

CAPT. MIDDLETON: Yeah, I mean, the aircraft operating manual that all the crew members carry has guidance for the approach. Within that, the AOM, there's also a briefing guide that we've created that has all the different steps that are required. We also cover that type of approach in recurrent training every year when the crew members come back. So they have it in a lot of places, I guess.

CAPT. LAWRENCE: For vertical speed approaches, what is the maximum value of a vertical speed selected for the pilots to conduct a vertical speed approach?

CAPT. MIDDLETON: Okay, it depends where they are.

CAPT. LAWRENCE: Right.

CAPT. MIDDLETON: If the crew members are flying more than 1,000 feet above the ground, the maximum value that they can select per our standard operating procedure is 1500 feet per minute. Once they come from 1,000 feet down, that value decreases to 1,000 feet per minute as the maximum that they should select.

CAPT. LAWRENCE: You alluded to training and simulator and such. How often are pilots seeing non-precision approaches in the simulator?

CAPT. MIDDLETON: They see them every time they come back in the simulator. We do it every year in recurrent training.

CAPT. LAWRENCE: Okay. Between the profile and vertical speed, how many times will they see a profile approach in training

and how many times would they see a vertical speed approach?

CAPT. MIDDLETON: They see the profile approaches more often than they do the vertical speed.

CAPT. LAWRENCE: Could you briefly discuss the steps for a profile approach? How would a pilot in the cockpit set up for a profile approach?

CAPT. MIDDLETON: Dr. Lawrence, can you bring up the attachment for the profile briefing guide, please?

CAPT. LAWRENCE: I believe that would be Exhibit 2-H, page 4, Mr. Soper.

While he's pulling that up, why don't you just go ahead and verbally explain what it is.

CAPT. MIDDLETON: Okay. Basically the guide that he's going to bring up, the profile approach, to do this type of approach there are very particular steps that have to be done, and what you will see is that, in actuality, there's only about three things that the crew members actually have to do, but there's all sorts of things that they should verify.

And what you're looking at now is a briefing guide that was created, and it's very important to understand that this briefing guide is a generic briefing guide in the respect that there are multiple types of non-precision approaches that our crew members could fly. The particular one they were flying or setting up for this evening would have been a localizer approach.

So, as they're going through the briefing guide, there

are some things that they may find that are not pertinent to a localizer approach, so the crew members understand that it's generic in that there are some things they may come to that don't necessarily apply to what they're doing.

But what you're looking at right now is the first page of the Profile Approach Briefing Guide. And in this matrices that you're looking at, the first thing the crew member would do, starting on the left, is they would just determine, okay, what kind of approach am I shooting, and in this case it's a localizer.

And so, they come down and there's -- you come down four or five boxes there to where you see LOC on the left, and as this chart flows over to the right, it initially sets them up for the few things -- remember, I told you there's a few things that they just have to do. And one of the things they have to do is to program the flight management computer to recognize the particular approach that they're going to fly. So, one of the steps in the briefing guide is, if you're going to do a localizer approach, it actually tells you what the title would be of that approach on the approach chart that they carry, and then it also goes one step further to show how that would look in the flight management computer, because sometimes the titles may be a little different.

As we flow across further on, it shows them visual cues that may be presented to them during this type of approach. There's a column that says "AFDS Roll Mode," and I always tell the crew members that that's basically the button you should press

when you're cleared for the approach, and that helps them know that. And in the final column there's a position to show where to press a button to get a particular display. And again, once again, these are just steps to kind of set things up as they -- could you please bring that down to the next page?

Actually, I'm sorry. Just underneath the matrices. There we go.

Basically, step 1 is it's sort of, again, just reminding them of those things that one would have to do to shoot an instrument approach. You know, we're going to need to verify a few things, and so -- and again, and those seven or eight bullets that you see there, they're not all pertinent to a localizer approach, but there would be things in there. And basically, for example, one would be number 4, verify the temperature restrictions. Profile approaches, if the air is too cold and condenses too much, the aircraft could be lower than it thinks it is. So there are restrictions on the approaches. So they'll go through that.

Step number 2 is a very important step, and that is they need to determine what minimums they're going to fly down to. The minimums for the pilots are the point at which we have to make a choice to land or go around. So it's very important that they do that properly, and we've put bullets in there to help them determine that. Okay?

CAPT. LAWRENCE: Okay.

CAPT. MIDDLETON: And then if you could come on to the next one, please?

After they've decided that, they need to load into the approach and enter that particular number that they come up with. And if there's a -- you know, if there's additional wind and that sort of thing, there are adjustments that they may have to make. Beneath that, they need to brief what they've done.

Bullet 5 -- remember, I told you there's about three things that you just have to do. We have to load the approach, and we have to -- and number 5 is very critical. This is another physical action. They have to activate final. And essentially what this does is it's a confirmation to the computer of what you're going to do, and it actually converts the flight management computer in a way that it's no longer thinking it's en route. You've now told it it's at the airport and I'm going to fly an approach. So the crew members absolutely have to press that button. It's very critical.

Finally, the last item is that when they're ready to have the aircraft descend, there's another physical button that they have to press, and it tells them to do that.

CAPT. LAWRENCE: Okay. In the cockpit, they use this profile briefing guide. Who reads this in the cockpit?

CAPT. MIDDLETON: Typically, the pilot flying will read it after they've transferred controls to the pilot monitoring.

CAPT. LAWRENCE: The control display units, or the

computers with the keypads that are on the center console area and such, for these non-precision approaches, how would they set up those to be viewed during the approach itself? What pages are they looking at?

CAPT. MIDDLETON: You mean once the approach is loaded?

CAPT. LAWRENCE: For the profile approach, what pages would they be looking at the CDU while they're monitoring the approach?

CAPT. MIDDLETON: Oh. Well, we have a takeoff page, and on the takeoff page it actually shows that the computer is in the final approach mode, and it actually gives you a depiction of your position relative to the vertical guidance path.

CAPT. LAWRENCE: Okay.

CAPT. MIDDLETON: And so, they would watch that, and then the other crew member would typically look at the flight plan page, which would show where the aircraft is laterally navigating.

CAPT. LAWRENCE: You mentioned earlier that the decision altitudes and the minimums were critical to put in because they may be different between the vertical speed and the profile methods that are being conducted. If an approach changes, in other words, let's say they begin a profile approach method but decide to change to a vertical speed mid-approach, would that change the minimums?

CAPT. MIDDLETON: It could. There are some occasions where they may be the same, but no, generally it does change the

minimums.

CAPT. LAWRENCE: Okay. In that event, would that require re-brief of the approach?

CAPT. MIDDLETON: It would be a good idea.

CAPT. LAWRENCE: What would be the result -- on that profile briefing guide that you said activate the approach, there was also a sequence, I believe, that they have to clean up the approach so they get rid of the nav portion and such, and then they push that profile button, and so those are the three primary steps. If a pilot missed one of those steps, what would be the result?

CAPT. MIDDLETON: If you don't sequence the approach such that the flight management computer sees the line that it's going to fly on, or, in essence, is where it thinks it is, irrespective of pressing the profile button, the aircraft would not be able to determine the pitch-over point where the vertical guidance would begin, so it wouldn't work. It is a necessary step.

CAPT. LAWRENCE: And so the profile would not capture, is that what you're saying?

CAPT. MIDDLETON: That's correct.

CAPT. LAWRENCE: Okay. Is this procedure, reading the approach and sequencing the approach in the FMC, is that something that's unique to non-precision approaches or something UPS pilots do for all approaches?

CAPT. MIDDLETON: No, it's part of sort of the bedrock training, the initial -- whether they're doing a visual approach and they choose to have an instrument approach for backup, or they're doing a precision approach, as you say, extending the final, cleaning up the FMS is a procedure we do for all approaches.

CAPT. LAWRENCE: Okay. Who typically will be doing the button pushing in the CDU? Who cleans up this approach and sequences the approach?

CAPT. MIDDLETON: Typically the pilot monitoring is the one that will do that.

CAPT. LAWRENCE: Okay. I'm curious, too, given that -- you do fly the line, correct?

CAPT. MIDDLETON: Yes.

CAPT. LAWRENCE: Okay. So you're in the simulator and you're also on the line, so you have an ability to see pilots as they cycle through the training, but you also fly the line. Are non-precision approaches in general something the pilots see on a regular basis?

CAPT. MIDDLETON: No, they're not.

CAPT. LAWRENCE: How many would you say, in your experience, have you seen during the course of a year?

CAPT. MIDDLETON: I did two last year out on the line.

CAPT. LAWRENCE: Okay. And I believe you were part of the initial cadre for the A300 when the airplane came on line, so

that's about 14 years ago, correct?

CAPT. MIDDLETON: Um-hum.

CAPT. LAWRENCE: How many over the course of the 14 years have you seen on an A300?

CAPT. MIDDLETON: I would say the number that I did last year is fairly typical, and there have been some years where, when I'm out, I'll do them just to practice. But 90 -- I mean, a high percent of the time where we go, we fly visual approaches or those served by an instrument landing system.

CAPT. LAWRENCE: Okay. Is there any guidance to pilots that are flying the A300 if they are going to be conducting one of these profile methods to shoot the approach, is there any guidance for them to intercept the profile path -- and Dr. Bowers showed the 3.28 -- is there any guidance to intercept that from above?

CAPT. MIDDLETON: No.

CAPT. LAWRENCE: Are UPS pilots trained to combine the two methods, profile approach -- or profile method and the vertical speed method?

CAPT. MIDDLETON: There is a particular case on an approach which we would refer to as an ILS with the guide slope out, which can seem similar to a localizer approach, and in that case, there is a restriction that the aircraft does not pass beneath the final approach fix altitude. And there are occasions in profile mode where the aircraft may begin a descent a little bit early. So to prevent that from happening, we train the crews,

in the case only of an ILS glide slope out, that they remain at the altitude until they actually cross the final approach fix. And then the way that they transfer from that to the profile approach is by using vertical speed at 1,000 feet per minute down, and then pressing the profile button.

CAPT. LAWRENCE: Thank you.

Mr. Soper, could you bring up again Exhibit 2-A, page 40?

While he's bringing that up, that's the approach chart and such, in the case of 1354 -- and you've reviewed the approach chart for that, correct?

CAPT. MIDDLETON: Yes. Yes, I have.

CAPT. LAWRENCE: Was that the case here, where you would have to start a vertical speed down to intercept a profile?

CAPT. MIDDLETON: No, this is not.

CAPT. LAWRENCE: Is there any guidance that UPS provides their pilots that if the method that was briefed and doesn't occur, for instance, in this case, the profile does not capture for whatever reason, is there any guidance that UPS provides their pilots to abandon the approach?

CAPT. MIDDLETON: No, we don't have anything specifically written for that.

CAPT. LAWRENCE: Captain Kriz, good morning.

CAPT. KRIZ: Good morning, Captain Lawrence.

CAPT. LAWRENCE: Captain Middleton earlier explained the

steps required for a pilot to set up a profile approach on the A300. Can you tell me or walk through the visual cues that are in the cockpit to the pilot that would tell him he's properly set up a profile approach?

CAPT. KRIZ: Well, the visual cues available for the pilot are, first, the mode annunciations on the primary flight display, the top part, where you can see whether the correct modes of operation of the autoflight system have been engaged. The second visual cues the pilot will follow are the indications of the flight director guiding him along the flight path. And the third cues would be the vertical deviation indication. That is a sort of a glide slope indication that is presented on the navigation display that shows him the deviation from the computed flight path of the FMS.

CAPT. LAWRENCE: Typically, who monitors those cues during an approach?

CAPT. KRIZ: These are monitored by the pilot flying.

CAPT. LAWRENCE: How does a pilot know on one of these profile approaches that he's arrived at the decision altitude?

CAPT. KRIZ: On that aircraft, that would be by looking at the altimeter and monitoring the altimeter reading corresponding to the index bug he has set for the decision altitude and, second, by the callout of the pilot monitoring that would give a callout 100 feet above the decision height and the decision height as well.

CAPT. LAWRENCE: Okay. On the altimeter, there is some type of bug or any type of indices on there that guides the pilot what altitude they need to be looking at for the decision altitude?

CAPT. KRIZ: I didn't perfectly understand the first part of the question. On the altimeter, you said?

CAPT. LAWRENCE: On the altimeter.

CAPT. KRIZ: Yes, on the altimeter there is an index bug, an orange index bug that can be set by the pilot, and that is normally set to the minimum.

CAPT. LAWRENCE: Is there a light associated with that when they arrive at the decision altitude? Is there an aural alert? Is there anything other than just looking at the altimeter?

CAPT. KRIZ: No.

CAPT. LAWRENCE: And you mentioned earlier --

Mr. Soper, if you could bring up Exhibit 2-A, page 47, please?

We're going to show a picture from UPS guidance material for the flight mode annunciator. You talked about that just a moment ago. Can you explain the role of the flight mode annunciator, the FMA, on the Airbus A300?

Yeah, Mr. Kriz -- Captain Kriz.

CAPT. KRIZ: Sorry. Could you repeat the question?

CAPT. LAWRENCE: Sure.

CAPT. KRIZ: The role of the flight mode annunciator?

CAPT. LAWRENCE: Tell me what the role is. This is the flight mode annunciator, and so on the pilot flying -- on the PFD, the pilot flight display, primary flight display, what is the role of this?

CAPT. KRIZ: So, the role of this flight mode annunciator is the key information on the parameters the aircraft is guided. That means what are the different targets for the autoflight system or what are the modes the autoflight system is in. Beginning from the left, the autothrottle system. The second column shows the vertical guidance. The third column shows the lateral guidance. The fourth column shows the engagement status here for low visibility operation. And the last column shows the engagement status of the different systems, which is flight director, autopilot, autothrust.

CAPT. LAWRENCE: Very good.

Mr. Soper, would you scroll down one page to page 48, please?

This picture is depicting what, Captain Kriz?

CAPT. KRIZ: So this picture is displaying that the autothrottle is in speed mode. That means the autothrottle controls the speed, as indicated by the blue bug. The second window shows that the aircraft is in altitude hold mode. That means it flies level, and that the profile descent has been armed, as it is shown in blue. And the third column shows that the

localizer has been captured and the aircraft is tracking the localizer.

CAPT. LAWRENCE: And just for clarification, too, this was a picture taken of an A300 simulator at UPS during some of the ops investigation work. You answered one of my questions as far as the P descent, the P.DES that's in the second from the left column there, and it's illuminated in blue. That indicates what?

CAPT. KRIZ: That indicates that the pilot has pushed the profile button and the system is armed to intercept the vertical path.

CAPT. LAWRENCE: What would occur once the path is intercepted and captured?

CAPT. KRIZ: The blue indication of profile descent would disappear and would move up to the top line, indicating in green P.DES.

CAPT. LAWRENCE: Can a pilot get that armed P descent, in other words -- or indicating that they are armed for the profile, can they get that if they have not activated the approach?

CAPT. KRIZ: When the approach is not activated in the flight management system, this is not possible.

CAPT. LAWRENCE: Okay. So that's a required step to get that indication on the flight mode annunciator, correct?

CAPT. KRIZ: That's correct.

CAPT. LAWRENCE: Okay. Can a pilot see that P descent

on the flight mode annunciator if he hasn't sequenced the approach in the flight management computer?

CAPT. KRIZ: Yes, he could see that.

CAPT. LAWRENCE: Okay. Is there any warning on the flight mode annunciator that tells a pilot that he has not sequenced the approach?

CAPT. KRIZ: No, there is no such warning.

CAPT. LAWRENCE: And, Captain Kriz, based on the investigation, as mentioned earlier, the indications are that the pilots of this accident flight began and they briefed a profile approach and midstream, at some point in time prior to the final approach fix, they reverted to a vertical speed approach. Where on the autopilot --

And while I'm doing this, Mr. Soper, if you'll bring up 2-A, page 75, please?

Where would a pilot make input on the mode control panel to put input for the vertical speed?

CAPT. KRIZ: Could you repeat the question?

CAPT. LAWRENCE: Sure. If we're going -- if a pilot is going to revert from profile to a vertical speed, where does he do input to make that change?

CAPT. KRIZ: Yeah, the input is done, as you mentioned, on this flight control panel. And you see in the red-circled window a value that corresponds to the vertical speed selected. Here it is shown as being zero, and the little knob with the

little dial below that one is the one used to select the desired vertical speed.

CAPT. LAWRENCE: So the mode control panel is on the glare shield, correct?

CAPT. KRIZ: That's correct.

CAPT. LAWRENCE: And then the value that the pilot selects is indicated in those boxes right there where the red circle is, correct?

CAPT. KRIZ: That is correct.

CAPT. LAWRENCE: Is the selected value repeated on the flight mode annunciator?

CAPT. KRIZ: No, it is not.

CAPT. LAWRENCE: In later models of the Airbus, the 320, the 330, 340 and such, are there selected vertical speed values indicated on the flight mode annunciator on the newer generation Airbus?

CAPT. KRIZ: Yes. At the current stage, these are indicated on the primary flight display.

CAPT. LAWRENCE: And can you explain what went into Airbus's philosophy to include a selected value on the flight mode annunciator relative to vertical speed, on the newer airplanes?

CAPT. KRIZ: The reason for that selection was an evolution of the display philosophy that has been chosen for the new generation airplanes. Contrary to the Airbus 300 type of aircraft, in the new generation airplanes you have more

integration of information into the primary flight display. That means in addition to the horizon display, you not only have the speed, you have altitude, you have heading, and last but not least, vertical speed.

And the philosophy that was put in place was when a pilot selects a target value he can see his selected target value on the primary flight display. Initially, this was true for all parameters except for the vertical speed because of the location of the scale and the size of the scale. And at the certain moment after they entry into service, it was decided to complete this philosophy insofar that the target vertical speed the pilot chose on the FCU was also transferred to the primary flight display and, thus, displayed on the flight mode annunciator.

CAPT. LAWRENCE: Captain Middleton, I should have asked you earlier, how does UPS train their pilots to conduct these relative to the autopilot? Do they want the pilots flying these non-precision approaches on autopilot or hand-flying?

CAPT. MIDDLETON: They prefer that they be on the autopilot, yes.

CAPT. LAWRENCE: Okay. Captain Kriz, go back to you. Based on an autopilot for a profile approach, if the pilot doesn't disconnect an autopilot, will the autopilot on a profile approach automatically disconnect?

CAPT. KRIZ: The autopilot would disconnect at the point 50 feet below the decision height, or in this case, the MDA.

CAPT. LAWRENCE: The MDA, is it an MDA that's on the altimeter bug, or is it an MDA that they've entered into the computer?

CAPT. KRIZ: The MDA is entered into the flight management computer as one step of arming the profile mode.

CAPT. LAWRENCE: So if they have that entered into the flight management computer, the MDA, but they never fly the profile and they decide to fly a vertical speed, would the autopilot ever disconnect?

CAPT. KRIZ: No, it wouldn't.

CAPT. LAWRENCE: It would have to be disconnected by the pilot manually?

CAPT. KRIZ: That's correct.

CAPT. LAWRENCE: Okay. Thank you.

Captain Laurentz, good morning. UPS operates Boeing 747s, 757s, 767s, and MD-11 aircraft in addition to the A300, correct?

CAPT. LAURENTZ: That's correct.

CAPT. LAWRENCE: To your knowledge, do these aircraft also incorporate flight mode annunciators on the pilot flying displays?

CAPT. LAURENTZ: They do.

CAPT. LAWRENCE: Okay. Does UPS require the pilot, as a part of their standard operating procedures, to verbally acknowledge changes in the flight mode annunciator?

CAPT. LAURENTZ: There is a protocol relative to the pilot flying and the pilot monitoring in terms of flight mode annunciator changes.

CAPT. LAWRENCE: Does UPS have a policy fleetwide as far as conducting separate briefings for an approach if it changes midstream? In other words, if you begin a profile approach and it reverts to a vertical speed approach, would that require a re-briefing of the approach?

CAPT. LAURENTZ: It would. Anytime that there's a change to the original approach briefing, whether it's a runway, the type of instrument approach, the mode of automation, at a minimum, that piece that has changed would have to be re-briefed.

CAPT. LAWRENCE: Okay. I asked Captain Middleton earlier about if there was any guidance for the pilots at UPS on the A300 to abandon approach in that case. Is there any guidance to abandon an approach fleetwide at UPS if they don't get what they are planning on by the final approach fix?

CAPT. LAURENTZ: It would be the expectation, and it really kind of ties back into what I -- back into the approach brief. Both crew members, or all three if there's a third crew member on board that aircraft, have to have a shared mental model. So, as part of our SOPs, that would be the appropriate expectation, and that is reinforced in training as well.

CAPT. LAWRENCE: Is that articulated in any guidance material for UPS?

CAPT. LAURENTZ: It is as it relates specifically to the approach briefing and the criteria associated with that. So if an element within that approach briefing were to change, the expectation would be either to re-brief it if there's time to do that prior to initiating the actual approach, or build yourself some time, which would be either take a turn in holding, take radar vectors, or essentially abandon that particular approach.

CAPT. LAWRENCE: Thank you.

Mr. Soper, if you can bring up Exhibit 20-G, page 2, please?

Captain Laurentz, this is referring to the Flight Operations Manual, the FOM, guidance for standard approach briefings. Is this the approach briefing template that all pilots at UPS are trained on?

CAPT. LAURENTZ: Yes, it is.

CAPT. LAWRENCE: During our investigation, we noticed that there is a briefing item in here that talks about anticipated weather. It's about the fifth from the bottom, coming up, and it talks about anticipated weather, and we noticed that it wasn't necessarily in the AOM for the A300. Is this the overriding briefing template that the pilots are supposed to use for standard approach briefings?

CAPT. LAURENTZ: It is.

CAPT. LAWRENCE: Okay. Staying with that anticipated weather, what source of information are pilots trained to use when

they're discussing anticipated weather during their briefs?

CAPT. LAURENTZ: One of the things that we train our pilots to do is to brief as early as possible. In fact, that's actually one of the SOPs. So, with that in mind, anticipated weather would be as received to the flight crew via ACARS. That is the standard way of receiving it. ACARS would either pull the weather report or, if it's a digital, ATIS, which is produced by the local airport itself. The flight crew would pull that up. That would actually be the preferred method. So the preferred method, and you can pull that up hours in advance, that would be the criteria which would be used in terms of the anticipated weather. And that would be part of the approach briefing in terms of how that anticipated weather might affect that particular approach.

CAPT. LAWRENCE: So ACARS and ATIS information would likely be -- would that be the most current information the pilots would have on the flight deck?

CAPT. LAURENTZ: It is the most current. And, in fact, as it relates to digital ATIS, you can program the ACARS, which is the, you know, the computer that we receive digital information on, to automatically upload the latest information.

CAPT. LAWRENCE: Would you say it's important for UPS pilots or pilots in general to have the most current information relative to weather when they're conducting these approach briefings?

CAPT. LAURENTZ: It's important as it relates to the approach briefing itself, and it's, I would say, critical prior to actually initiating the approach, because there are certain requirements that you have to have prior to initiating an approach.

CAPT. LAWRENCE: Does UPS train the A300 under AQP or traditional 121?

CAPT. LAURENTZ: AQP.

CAPT. LAWRENCE: Okay. Just briefly, what's the overall philosophy of AQP training?

CAPT. LAURENTZ: AQP is an alternate and voluntary method of training our flight crews. It requires us to meet or exceed the standard 121 requirements relative to train non-AQP carriers. Our programs are very data driven. It requires us to not only calibrate our instructors, collect the data, assess the data, and make changes appropriately related to that data. That program then is forwarded to our POI, our local FAA office, for review and approval.

And one of the methodologies that we're required to execute to, it's called an ISD process. And again, it's an instructional system design so that any change that we make to a training program has to be well thought out, it has to be articulated in a data perspective, we have to define what success would look like, and then we have a quality assurance program to ensure that we meet those standards.

CAPT. LAWRENCE: Are non-precision approaches under AQP demonstrated maneuvers or are they train to proficiency?

CAPT. LAURENTZ: There's a train to proficiency concept relative to AQP, and what that essentially means is, when a crew member enters the training program, they won't leave until either they're trained to proficiency or training has been exhausted. So the concept is -- so, to answer your question specifically, it is a train to proficiency maneuver. If a particular crew member needs additional training to become proficient, that information is then documented.

CAPT. LAWRENCE: How does UPS monitor UPS pilots' execution of non-precision approaches in both simulator and line operations?

CAPT. LAURENTZ: In the simulator, it starts off -- and Captain Middleton mentioned this, as well -- it starts off in our qualification program, which is our initial training program for either a new crew member or a crew member going to a new piece of equipment. It's also further trained when a crew member either upgrades or qualifies on a new piece of equipment. And then it's also trained and evaluated every year in recurrent training, which is called continuing qualification.

CAPT. LAWRENCE: Okay. You mentioned earlier that it was data driven. What data are you using?

CAPT. LAURENTZ: Our instructors are trained on what the qualification standards are. So essentially what that is, is the

parameters and the specific tasks associated with conducting a non-precision approach. So they collect data, and it's done through a matrix, if you will, and the crew member either meets qualification standards or they're essentially below qualification standards, and those that are below need to be remediated. That data is then used a couple of different ways. One, it's used as it relates to that specific pilot to ensure that they meet the qualification standards; and, two, it's also a methodology that we use to assess the viability of the program itself and do we need to make any changes programwide.

CAPT. LAWRENCE: Okay. We noticed during the review of the syllabuses that the 2012 and the 2013 CQLOE, the evaluation portion of the recurrent cycle, included non-precision approaches, and the most recent recurrent that both accident pilots had conducted on June 26th of 2013 included non-precision approaches as part of the evaluation. What data did you or UPS see that required or precipitated including non-precision approaches in the recurrent cycle?

CAPT. LAURENTZ: There's a couple things. One, the data in and of itself, what we look at is frequency, as an example, and as Captain Middleton indicated earlier, that it is, with a few exceptions, most pilots don't see a lot of non-precision approaches when they're actually operating the aircraft. And as a result, we intuitively add or include non-precision approaches for that reason in and of itself.

Now, in addition to that, it's an opportunity to evaluate a crew member's procedural knowledge, and it's also an opportunity to really evaluate the CRM associated with a non-precision approach, because it takes a fair amount of coordination and teamwork to execute one flawlessly. So as a result of that, those are kind of the indicators.

CAPT. LAWRENCE: Does UPS or -- twice now we've heard that it's not something that these pilots see quite often, non-precision approaches. Do pilots log non-precision approaches on a regular basis, or is there any way to collect data on what type of approaches they are shooting?

CAPT. LAURENTZ: The only data that we're required to collect, and it's not even relative, quite frankly, to the actual individual pilot, it's relative to the maintenance of the aircraft, and that is if a CAT II, CAT III autoland approach was logged.

CAPT. LAWRENCE: Is that through the ACARS system?

CAPT. LAURENTZ: That is through the ACARS, yes, sir.

CAPT. LAWRENCE: So they're logging CAT III approaches for currency, I guess, on the equipment. Is there a means or a way that they can log non-precision approaches so you can at least see how often non-precision approaches are being conducted by your pilots?

CAPT. LAURENTZ: There currently is not a way to do that. But I think intuitively we know that there aren't that many

being flown, and as a result we include that in training. We also encourage during OE, which is an operating experience, when a captain or first officer first leaves the training center and are newly qualified on that aircraft, although OE is not technically training, we highly encourage -- and this is written in their manual -- to conduct a non-precision approach if possible.

There are many cases where there that's not possible as a result of it's not the preferred approach or there's not an approach to the preferred runway. If you're going into a busy airport, some airports may not even have a non-precision approach. So it's not always practical, but we attempt to drive our crew members to do one in the airplane as well.

CAPT. LAWRENCE: Well, you mentioned that you do encouraging -- you encourage the instructors to make sure that their students, I believe, on OE -- that's pseudo-training type of line operations. How does UPS in general encourage their pilots to go out and maybe practice non-precision approaches?

CAPT. LAURENTZ: I don't believe that there's actual verbiage that would indicate that; however, we do have verbiage relative to automation policy to the extent that we've asked our crew members, or we encourage our crew members to ensure that they can hand-fly, which is not one in the same, obviously, relative to a non-precision approach, but to maintain that skill.

CAPT. LAWRENCE: Has UPS conducted any LOSA audits of their operations?

CAPT. LAURENTZ: We have not currently done a LOSA, although it is under evaluation.

CHAIRMAN HERSMAN: Captain Lawrence, can I just jump in? If I could just remind everyone again to try to project a little bit. We have a lot of pilots and others in the room who are asking for people to speak up just a bit.

CAPT. LAWRENCE: Yes, ma'am.

CHAIRMAN HERSMAN: Thanks.

CAPT. LAWRENCE: Mr. Steinbicker, good morning. Does the FAA know how many non-precision approaches commercial pilots are executing on a yearly basis?

MR. STEINBICKER: I'm not aware of any national program that monitors the number of non-precision approaches conducted in our airspace system.

CAPT. LAWRENCE: Is there any data collection that is on the horizon that -- are there any programs to take a look at maybe how many non-precision approaches these pilots are conducting?

MR. STEINBICKER: I'm not aware of any programs directly associated with non-precision approaches. I think, although we do have some data sources that would identify particular parameters associated with all approach operations, none specifically focused on non-precision approaches.

CAPT. LAWRENCE: Okay. I asked Captain Laurentz if their operation and their company was encouraging their pilots to practice non-precision approaches on the line. Is there any

guidance from the FAA to encourage pilots to practice non-precision approaches on the line?

MR. STEINBICKER: I'm not aware of any programs at a national level. At a field level, at an operator certificate office level, I think our expectation is that if there are trends from a risk standpoint, we would -- our expectation is that appropriate actions would be taken. We don't have any expectations from a national standpoint encouraging pilots to execute non-precision approaches with any frequency.

CAPT. LAWRENCE: Thank you.

Mr. Soper, if you'll bring up Exhibit 2-GG, page 2, please?

Mr. Steinbicker, this is Advisory Circular 120-108. What is this advisory circular?

MR. STEINBICKER: Advisory Circular 120-08 [sic] describes acceptable recommended methods for conducting what's called continuous descent final approach. The background on this advisory circular, it's also associated to one of the reference -- related reference materials is Advisory Circular 120-71 Alpha, A, which is our standard operating procedures AC. This grew out of, I think, many years of operational experience with non-precision approaches.

As alluded to during the opening remarks, non-precision approaches are designed in a stair-step fashion, and for many years were conducted in what was called in the vernacular dive-

and-drive method, meaning that each would be flown down to minimum altitude until you reached the next point where the next minimum altitude can be met.

In the 1990s, I think there was a growing awareness that the dive-and-drive method probably wasn't a preferred way to conduct business for a number of reasons. At that time, I think -- and that along with the frequency of controlled flight into terrain accidents/incidents, the industry and FAA got together via the Commercial Aviation Safety Team and began promoting two things: One, greater development and publication of what we call 3D approaches, procedures with vertical guidance, ILS, and our RNAV GPS approaches with vertical guidance; as well as greater encouragement and promotion of techniques and use of available technology to fly a vertical profile on non-precision approaches. This AC outlines some of those techniques as well as the advantages of continuous descent final approach.

CAPT. LAWRENCE: You mentioned something interesting. You said there were -- that the dive and drive is -- you're trying to get away from the dive and drive for a number of reasons. Can you explain some of those reasons?

MR. STEINBICKER: I think while dive and drive is not inherently unsafe, we recognize that flying CDFA is a safety enhancement. If you go to page 2, I believe, on the advisory circular -- and actually, one more, where it talks about the advantages. So some of these advantages include improved pilot

situational awareness and reduced pilot workload when properly conducted, improved fuel efficiency, reduced noise levels. There are also procedural similarities to other approach operations, for example, approach procedures with vertical guidance and precision operations, and then it continues on the next page as well.

And there's also a reduced probability of infringement on the required obstacle clearance surfaces. So what that means is, if you spend less time at those minimal obstacle altitudes, there's less chance that you'll actually penetrate those altitudes.

CAPT. LAWRENCE: This advisory circular is describing a technique, though, correct?

MR. STEINBICKER: Yes. There's a specific section, no specific equipment is required for CDFA. There are a number of techniques that can be used, as well as equipment, anything from barometric vertical navigation to a combination of DME and timing. There's flexibility in the advisory circular.

CAPT. LAWRENCE: Okay. If there are inherent risks with doing dive and drive on non-precision approaches and you have an advisory circular that describes a technique, why doesn't the FAA just mandate CDFA instead of doing dive and drive?

MR. STEINBICKER: There are certain -- and we also include this in the advisory circular -- there are certain types of operations and approach designs that don't lend themselves to the conduct of CDFA. We speak to that in the training

recommendations within the advisory circular as well. The state of affairs today versus what it was 20 years ago, I think CDFA has become the industry norm across the board. We continue to encourage that, but there are times where it might be necessary for a pilot to do something more in line with dive and drive, so -- with going down to the minimum.

CAPT. LAWRENCE: Okay.

MR. STEINBICKER: If you bring up the training section, I could speak to that a bit more. So our response in the past about why we haven't, for example, required rule making is, one, we've achieved the industry standard of having these approaches conducted visa CDFA, as well as there is a certain amount of flexibility that would be required in the operations.

CAPT. LAWRENCE: How do you know operators are incorporating this technique in their manuals?

MR. STEINBICKER: We have incorporated -- along with this advisory circular, we have our Advisory Circular 120-71 that speaks to this. We also have in our inspector guidance and our Order 8900.1, Flight Standards Information Management System, we speak to CDFA. And we have, under our operations specifications, we have various methods at a field level, not a national level, to have awareness of how these operations are being conducted.

CAPT. LAWRENCE: Captain Middleton, I'm going to ask, on the A300, do you train your pilots when they're -- instead of doing just the dive and drive on vertical speed, do you

incorporate continuous descent? Do you incorporate the techniques of this advisory circular when you're conducting vertical speed non-precision approaches?

CAPT. MIDDLETON: Oh, yeah, absolutely.

CAPT. LAWRENCE: Where is that guidance written?

CAPT. MIDDLETON: It's in the Pilot Training Guide.

CAPT. LAWRENCE: Okay. The Pilot Training Guide, I think that's the first time we've heard that today. Just to be clear, you mentioned earlier the Aircraft Operating Manual, the AOM. That is an FAA-approved document, correct?

CAPT. MIDDLETON: Yes, correct.

CAPT. LAWRENCE: And what is the PTG, or the Pilot Training Guide?

CAPT. MIDDLETON: The Pilot Training Guide is a tool that we use to -- I don't know the word to use, but it's best practices and techniques to accomplish the goals that are in the AOM, the procedures.

CAPT. LAWRENCE: Is that manual, the PTG, is that an FAA-approved manual or an internal document to UPS?

CAPT. MIDDLETON: It's an internal document to UPS.

CAPT. LAWRENCE: And then, Captain Laurentz, fleetwide at UPS are they incorporating or training the techniques of CDFA, continuous descent final approach?

CAPT. LAURENTZ: Fleetwide, yes. By mode of operation, as it relates to ILS being the preferred approach, that would take

care of itself. Using a profile mode in and of itself would alleviate that. It also meets the qualification standards. As Captain Middleton indicated, it would be recorded as a quality escape, if you will, or an unacceptable maneuver if there was a dive and drive that we identified in the simulator, and that would be across all fleets.

CAPT. LAWRENCE: Okay. Let me stay with you, Captain Laurentz, if I could. Could you define what UPS's stable approach criteria is?

CAPT. LAURENTZ: Yes. The stabilized approach criteria is located in our FOM, our Flight Operations Manual, and essentially -- it's also replicated in each of the Aircraft Operating Manuals, as well.

CAPT. LAWRENCE: What is the expectation of a UPS pilot upon arrival at 1,000 feet? I'm assuming that 1,000 foot is the stable approach criteria, correct?

CAPT. LAURENTZ: That is correct.

CAPT. LAWRENCE: Okay. Mr. Soper, could you bring up 2-Z, page 3, please?

This is the FOM reference you were talking about?

CAPT. LAURENTZ: Yes, sir.

CAPT. LAWRENCE: Okay. At arrival at 1,000 feet, what is the expectation of a UPS pilot if they are not stable?

CAPT. LAURENTZ: The requirement would be to discontinue approach and execute a missed approach.

CAPT. LAWRENCE: Who can call for a go-around at UPS?

CAPT. LAURENTZ: Any of the three crew members. And I say three, if there is an IRO on an international or a long, over 8-hour flight. So both the captain, the first officer, or pilot flying, pilot monitoring, depending on how you split it up, as well as the IRO could call, would be required to call go around.

CAPT. LAWRENCE: Okay. Mr. Soper, can you bring up Exhibit 2-X, page 11?

Captain Middleton, these are the required callouts for a non-precision approach on the A300, correct?

CAPT. MIDDLETON: Yes, that's correct.

CAPT. LAWRENCE: Are these callouts identical for a vertical speed and a profile?

CAPT. MIDDLETON: Yes.

CAPT. LAWRENCE: Okay. At the 1,000 feet above touchdown, there's a pilot monitoring call and it says, "One thousand feet, instruments crosschecked/no flags." What is being crosschecked at this point by the pilot monitoring?

CAPT. MIDDLETON: To indicate that the instrumentation is reading the same, the vertical guidance, airspeed. The no flags reference is if one of the instruments were to be showing a fault. That is a term used to indicate that there's a fault. So no flags means there's no faults.

CAPT. LAWRENCE: Okay. There's a 500-foot call down by the pilot monitoring, as well, and it says, "500 feet, on speed,

sink 7." Is this a stable approach call?

CAPT. MIDDLETON: Essentially, that is, yes.

CAPT. LAWRENCE: Okay. Is stable approach criteria on the A300 still 1,000 feet?

CAPT. MIDDLETON: It's the same, yes.

CAPT. LAWRENCE: Okay. Captain Laurentz, has UPS taken a look at initiating a stable approach call at 1,000 feet fleetwide?

CAPT. LAURENTZ: We are evaluating that right now.

CAPT. LAWRENCE: Where is that in the process right now?

CAPT. LAURENTZ: It's in internal review. We've discussed the concept with our local FAA office, but we have not yet come to the exact wording and terms of, (a), if we're going to and, (b), how that might be worded.

CAPT. LAWRENCE: Okay. And back to Captain Middleton. I'm sorry to be moving back and forth, but I want to ask this: The approaching minimums call is for the pilot monitoring. What is the delineation of duties as far as looking out the cockpit on one of these non-precision approaches? Is the pilot monitoring staying inside the entire time, or is the pilot monitoring looking up and the pilot flying looking down? I mean, how does -- where are they looking on these approaches?

CAPT. MIDDLETON: Well, it depends on the type of approach you're doing, but -- and when I say that, a precision approach, it's a little bit different, but essentially, at

approaching minimums, the pilot monitoring is inside feeding to the pilot flying the information relevant to their position, you know, because we're getting close to the point where we have to make a decision. Thus, the person that has to make a decision has to do that based upon visibility, and so the pilot flying is becoming more and more looking outside than in, while the pilot monitoring is looking inside to verify that they are where they're supposed to be.

CAPT. LAWRENCE: Okay. Just to be clear, what are the stable approach criteria? What are those criteria that you're looking for at 1,000 feet?

CAPT. MIDDLETON: Okay. As the aircraft passes through 1,000 feet, there are six items, and the first one is that the aircraft is in the landing configuration, meaning the flaps and gear are where they need to be for landing and that the landing checklist is complete.

The second item is that the airspeed has to be plus 10 or minus 5 of whatever the referenced airspeed for that landing would have been.

Now, the third item says that the aircraft cannot be sinking any more than 1,000 feet per minute down. There is a provision in there that it can be more, but that's only if you had some sort of flight control anomaly or something was causing that. So it could be as much as 1200, but 1,000 is the number.

The fourth item is the aircraft has to be in a stable

position from which a landing in the touchdown zone can occur. And so, basically that's am I, you know, where I need to be such that, you know, I'm not too low.

The fifth item is -- let's see. By 200 feet, the aircraft has to be aligned with the centerline, because we have some approaches that come in at a little bit of an angle. And the thrust has to be spooled such that you're maintaining the speed that you had referenced. So, all six of these things have to happen at 1,000 feet.

CAPT. LAWRENCE: Is there any case where 1500 feet vertical speed down would constitute stable approach?

CAPT. MIDDLETON: From 1,000 feet down? No.

CAPT. LAWRENCE: Okay. Captain Kriz, I want to just get your thoughts on stable approach criteria from an Airbus perspective. What is the Airbus stable approach criteria?

CAPT. KRIZ: The Airbus stable approach criteria are eventually the same as those for UPS. We mention in the general regulations that the aircraft is on the lateral vertical flight path, that the aircraft is in the desired landing configuration, that the aircraft is at the speed that is desired for the approach with the correct thrust rating and the trim setting for the speed, and that there is no excessive flight path or flight parameter deviation.

CAPT. LAWRENCE: And I should have asked Captain Middleton, at UPS, who can call a go-around?

CAPT MIDDLETON: Either pilot.

CAPT. LAWRENCE: Either pilot?

And, Mr. Steinbicker, based on FAA guidance, how important is stable approach criteria when conducting a non-precision approach?

MR. STEINBICKER: I think our guidance material emphasize stabilized approach concept is important for all operations.

CAPT. LAWRENCE: All right. Okay. And then one more time back to Captain Middleton. I'm going back and forth here. The pilots of the accident flight received ground proximity warnings. They received a sink rate alert. What is the pilot response required for a sink rate alert?

CAPT. MIDDLETON: To immediately do something to make it stop, or go around.

CAPT. LAWRENCE: Okay. Can you expand on that? What is make it stop?

CAPT. MIDDLETON: Well, to manipulate -- you have to take positive control of the aircraft, be that through the automation, meaning the autopilot, or manually, but you have to take positive control to shallow the sink rate out. In that case, the one you gave, if it says sink rate, you need to lower the vertical speed immediately.

CAPT. LAWRENCE: Okay. Does it require a go-around for a sink rate alert?

CAPT. MIDDLETON: No.

CAPT. LAWRENCE: What about a "Too Low - Terrain" warning?

CAPT. MIDDLETON: That requires a go-around if it says that.

CAPT. LAWRENCE: Okay. So initiation of a "Too Low - Terrain" is an immediate go-around?

CAPT. MIDDLETON: Yes.

CAPT. LAWRENCE: Thank you, Mr. Lovell. That's all the questions the Technical Panel has.

MR. LOVELL: Madam Chairman, that concludes the questions for the Technical Panel at this time.

CHAIRMAN HERSMAN: Great. Thank you. We are on a tight schedule, so we are going to try to keep to it. We're going to take a 15-minute break. We will start promptly back at 10:15, and we'll move to questions from the parties.

(Off the record at 10:00 a.m.)

(On the record at 10:16 a.m.)

CHAIRMAN HERSMAN: Welcome back. We'll now continue with questions from the parties. We'll begin with UPS.

CAPT. MILLS: Thank you, Madam Chairman.

This question is directed towards Captain Laurentz. Can you elaborate on what the expected response would be if an EGPWS sink rate caution was received below 1,000 feet?

CAPT. LAURENTZ: The expected response below 1,000 feet

in that particular case would be to either execute a go-around or, if there was any doubt as to the aircraft's position, to execute what we call the CFIT maneuver, which is a much more aggressive maneuver where you disconnect the autopilot, go to firewall or maximum thrust, and rotate the nose to 20 degrees above the ground. That is a -- that's what Captain Middleton referred to was the general guidance.

The caveat to that would be, though, that if you were below 1,000 feet, at a minimum -- because the only time you could get that particular warning would be if you were exceeding the stabilized approach criteria. There's a graph in the systems manual that shows the sink rate necessary to trigger that particular alert. And, in fact, even below 1500 feet you would be exceeding the 1500 foot per minute rate of descent for that actual alert to trigger.

So, general guidance, absolutely, but specifically as it relates to what I would refer to as the hard deck, go around or, at a minimum, any doubt would require a CFIT maneuver.

CAPT. MILLS: And then a certain instance with that same sink rate caution above 1,000 feet where a different type of response would be appropriate?

CAPT. LAURENTZ: Yes, sink rate actually is triggered at 21 -- excuse me -- 2500 feet above the ground. So, in that instance, if you were, say, being vectored on down one, as an example, it would be -- depending on the sink rate, it would be

appropriate to just adjust the rate of descent.

CAPT. MILLS: An additional question, Captain Laurentz. Prior to an approach, you had mentioned a couple sources of, like, where crews can get ATIS and weather information via the ACARS. But prior to approach, can you elaborate what other ATIS sources might be available and, you know, is ATIS actually, you know, considered to be the controlling information that pilots use, you know, before they execute the approach?

CAPT. LAURENTZ: ATIS is considered to be the critical and controlling piece of information relative to weather prior to executing an approach. The mode that we generally use, at least here in the United States, is a digital ATIS, which we receive over the ACARS; however, not all airports have that. In which case, then, the other mode would be -- it's a recorded voice communication that the crew would pull up and listen to. The information essentially would be the same, though. It's just the mode of how you receive it.

CAPT. MILLS: Thank you. And one last question, Madam Chairman, again directed toward Captain Laurentz.

It was mentioned that UPS does promote a constant descent rate. That information was in the Pilot Training Guide. Is that source available anywhere else?

CAPT. LAURENTZ: It is in the Pilot Training Guide, but there is also guidance relative to vertical speed descents and constant rate descents in our AOMs as well.

CAPT. MILLS: Thank you. That's all, Madam Chairman.

CHAIRMAN HERSMAN: Thank you. IPA?

CAPT. WHYTE: Thank you, Madam Chairman.

Captain Laurentz -- sir, could you please bring up Exhibit 2-A, page 79?

In referencing what Captain Mills just asked, you said it's guidance, but I'd like to ask, is it actually written anywhere that if that sink rate call comes out, it is written that you will do a go-around or a CFIT maneuver?

CAPT. LAURENTZ: It's articulated not only in the preamble prior to the graph, essentially the chart that indicates both warning and caution alerts as it relates to enhanced ground prox. The preamble would indicate -- it says this does not alleviate the crew's response to take immediate action if the GPS -- EGPS alert continues, or if there is any doubt concerning the safety of the aircraft. It also is articulated, it's mandated that we cannot exceed 1,000 feet per minute rate of descent past the 1,000 foot as it relates to our stabilized approach criteria.

So, in those two cases, that would preclude the general guidance. This guidance, as it relates to the caution alerts, you have to take into consideration where in space you are to determine what is the appropriate remediation.

CAPT. WHYTE: I appreciate that, but I'd like to refer to the paragraph up that states, listed the sink rate alert as caution, requiring a crew response to adjust pitch and thrust and

silence the warning, per your AOM. I don't see anywhere in there that it states that you're supposed to do a go-around or a CFIT maneuver as you stated.

CAPT. LAURENTZ: I'm referring to FOM 02.01.02.03, and it's underlined and says exactly what I said.

CAPT. WHYTE: Captain Middleton, as a check airman both in the sim and in the airplane, Captain Laurentz referred to the Pilot Training Guide as being a reference-only manual. In your opinion, is there anything that you can find or you can recall that would contradict -- or would be inconsistent, I should say, between the two manuals?

CAPT. MIDDLETON: You know, with this discussion, there is a technique that's taught in the Pilot Training Guide referred to as the HOVE check, H-O-V-E.

CAPT. WHYTE: Could you please bring up Exhibit 2-A, page 60?

CAPT. MIDDLETON: And earlier on, we talked about one of the requirements for a profile approach, and that is, that the approach would have to be properly loaded and the final extended.

CAPT. WHYTE: Could you go to the top of page 61? If you scroll down just a little bit, you'll see that there's the HOV, and the E there is the "Extend the Centerline."

CAPT. MIDDLETON: The E is the extension. It is that final requirement to make sure that the FMS is sequenced properly. You will only find this language in the Pilot Training Guide.

It's not in the AOM or the briefing guide for the profile approach.

CAPT. WHYTE: So, just to clarify, a procedure that is used for all approaches -- visual, precision, and non-precision approaches -- is only found in a reference-only guide of the Pilot Training Guide?

CAPT. MIDDLETON: That is correct.

CAPT. WHYTE: Thank you, Madam Chairman.

CHAIRMAN HERSMAN: Thank you. TWU?

MR. PERSUIT: Madam Chairman, we have no questions. Thank you.

CHAIRMAN HERSMAN: Airbus?

CAPT. HOSKINS: Madam Chairman, Airbus has no questions. Thank you.

CHAIRMAN HERSMAN: FAA?

MR. DRAKE: Thank you, Madam Chairman. FAA has no questions.

CHAIRMAN HERSMAN: Thank you to the parties.

We'll move to the Board Member questions. Member Sumwalt?

MEMBER SUMWALT: Thank you. Captain Laurentz, I'd like to clarify this, also, about the sink rate calls.

I'd like to call up Exhibit 2-Charlie-Charlie.

And while that's being called up, which would be a higher controlling document in the hierarchy of things, the AOM or

the Pilot Training Guide?

CAPT. LAURENTZ: The AOM would be the higher authority.

MEMBER SUMWALT: Okay. So what I've asked to call up here, and this exhibit is from the UPS A300 AOM, and it's for GPWS/EGPWS Alert Procedures, under General, and let's scroll down and it says right there for sink rate. Can you read that, sir?

CAPT. LAURENTZ: It says, "Sink Rate," and then the crew response is "Adjust pitch attitude and thrust to silence the warning," I believe that says.

MEMBER SUMWALT: So to be clear, it does not say in this higher order of documents, it does not say to execute the CFIT escape maneuver or conduct a go-around; is that correct?

CAPT. LAURENTZ: It does not say that on that particular graph, but that graph is not in relation to our standardized approach criteria.

MEMBER SUMWALT: Okay. Let's scroll down to the next section that you cited a little while earlier, a few minutes ago, under the section that says -- keep scrolling down, just one more. And the section that you cited with the underlined section that says, "This does not alleviate the crew's responsibility to take immediate action." That's actually under a section called "Known GPWS/EGPWS Alerts." So you're talking about at airports where you have a known situation where you may get a TAWS warning here. It's not in the higher order of things where you're saying this is your guidance for that type of alert. Do you acknowledge that?

CAPT. LAURENTZ: I do. If I may, could we scroll back up to just below the section where we were talking about --

MEMBER SUMWALT: Please.

CAPT. LAURENTZ: If you could stop right there, please?

Again, it says, flight crew can take immediate and unequivocal -- "determine that terrain clearance is not a factor." Now, that is also under alerts, warning alerts and terrain alerts. So I think a crew would have to take the context of that information. In any case, though, quite frankly, for a sink rate alert to go off, you have to be unstabilized, and that information is contained in our systems manual as it relates to the envelope for those callouts to be --

MEMBER SUMWALT: Right, but pilots don't operate airplanes by the systems knowledge. That's how you -- that explains how the systems work. This is what the pilots are supposed to do, and if you look under the heading of that column, it says, "Crew Response." So what I'm trying to show is that under the crew response, it doesn't have the answer that, when questioned by Captain Mills, the answer that you gave, wasn't the text book answer that's here in this section here. The answer that you gave is actually one that is listed in the A300 Pilot Training Guide that says if you get the sink rate and you're in IMC -- if the flight is operating in IMC, the pilot flying must execute a go-around or the CFIT escape, CFIT recovery maneuver. So, the higher order of documents that you're referring to has

less specific guidance than the Pilot Training Guide. Would you like to comment on that?

CAPT. LAURENTZ: Again, I refer back to the FOM that says you have to be stabilized. The AOMs say that you have to be stabilized. One of the things that we use -- or I should say, to put this into consideration or context, GPS or -- GPWS, rather, or enhanced ground prox, that is, I'll say, one factor of a piece of information that crews utilize to execute the safe operation of any event, whether it's an approach or a takeoff or en route, if it's a terrain-type callout.

We as crew members don't rely on that, per se, because, quite frankly, it might not work. So situational awareness, understanding where you are immediately in space, if there is ever any doubt about that, you have to move the aircraft away from the ground, and that is an SOP, and it's clearly articulated in the standard operating procedures of stabilized approach.

MEMBER SUMWALT: I'm out of time, but I want to just close it out just for a second. Let's go back to the exhibit. Let's look at it one more time and show the distinction that where it says for a warning alert -- and scroll up just a little bit. Let's go up to the warning. And right here where it talks about a warning, "Terrain, Terrain, Pull Up," it specifically says that the crew response is to perform the CFIT escape maneuver -- CFIT recovery maneuver. But for the sink rate, and that's what we're talking about, it does not say that, and that contradicts what

your testimony was in response to Captain Mills' question.

CAPT. LAURENTZ: These callouts just have to be taken in the context of where an aircraft is in space and time.

MEMBER SUMWALT: Thank you. I'm out of time. I've got more questions. Thank you.

CHAIRMAN HERSMAN: Member Weener?

MEMBER WEENER: I'd like to talk a little bit about being at 2500 feet at the final approach fix. Coming through 6900 feet, 6800 feet, the aircraft was cleared for the approach, maintained 2,500 till established. When should he have gone down to 2300 feet, which was the published altitude for the final approach fix? And perhaps, Mr. Middleton, how would that be trained?

CAPT. MIDDLETON: Well, the rules say that he would have to be established on the course. So, once they intercepted the localizer with that clearance, he would be allowed to go down to 2300 feet.

MEMBER WEENER: And what are the procedures for intercepting a descent path being 200 feet high at the final approach fix?

CAPT. MIDDLETON: There's nothing specifically written for that. I mean, the procedures that we have assume that you would get down to that altitude. So it would be up to the crew members just to recognize that they were 200 feet high prior to that point, and they would have -- there would be a few options

they could use within the automation to manipulate the aircraft down 200 feet, but they would have to recognize that and then take positive action to make it happen.

MEMBER WEENER: Are there any differences in the stabilizer approach criteria for precision versus non-precision approaches?

CAPT. MIDDLETON: No, sir. It applies to all approaches.

MEMBER WEENER: And what about VMC versus IMC?

CAPT. MIDDLETON: The same. We make the same -- it's the same.

MEMBER WEENER: It's the same at UPS?

CAPT. MIDDLETON: Yes, sir.

MEMBER WEENER: Okay. How much emphasis is there on hand-flying, particularly hand-flying on non-precision approaches?

CAPT. MIDDLETON: There's very little. We don't train them to be flown, hand-flown. As you've heard earlier, there are many things that have to be done, and it's a fairly complex procedure and it demands both crew members' greatest attention. And so, we recommend that the autopilot be used. And, in fact, the guidance per the AOM that they have tells them that either the flight director, which gives them commands, or the autopilot has to be used. But all of their training is specifically with the automation to navigate those approaches.

MEMBER WEENER: So all of the training is focused on

automation. When would they experience hand-flown approaches?

CAPT. MIDDLETON: During the initial qualifications we do expose the crew members to situations where, because of such things as power failures where parts of the automation may not work, where they may have to do that. So they do get to see that in the initial qualification phase, and we have revisited in the Airbus from time to time in their continuing qual when they come back. So they do get times to do that, but it's fair to say that it's smaller than the amount of time that they fly the aircraft automated.

MEMBER WEENER: So the policy is for use of automation, and the policy in this case would have been for a profile descent; is that correct?

CAPT. MIDDLETON: Correct. That's what they briefed to do, yes, sir. And we would have encouraged that. The book says that given the two choices, whether you could do profile or vertical speed, we train them do profile if you can, unless there's a reason that you couldn't.

MEMBER WEENER: And the emphasis being on continuous vertical descent path?

CAPT. MIDDLETON: Absolutely. Absolutely, sir.

MEMBER WEENER: What would have been the indication -- and this is probably a question for Airbus. What would have been the indication that the vertical profile selection would not be activated, would not activate?

CAPT. KRIZ: The indication for the profile not being activated would be that the P.DES as indicated in blue in the armed state would remain there and would never change to the P.DES in green as the active mode.

MEMBER WEENER: And what would have been the response on the mode control panel? In other words, when he selected the vertical descent or profile selection, what would have been the response to the panel, the model control panel?

CAPT. KRIZ: Well, the moment the pilot reverts to vertical speed and engages the vertical speed mode, this cancels the profile mode.

MEMBER WEENER: But if he presses the profile button, does it light up or does it just ignore the input?

CAPT. KRIZ: No, it indicates the pilot has pressed the profile button.

MEMBER WEENER: So it goes into an armed state?

CAPT. KRIZ: It goes to an armed state. And when the capture conditions are fulfilled, it would go in the active mode, meaning that the indication would be green. If it does not, it stays in the armed mode and the pilot reverts or the pilot stays in the active mode that is before. In this case, this would be the altitude hold mode. The aircraft would not go into descent.

MEMBER WEENER: Okay. So it would have -- instead of selecting -- instead of activating or having profile go active, it would have stayed in, basically, altitude hold?

CAPT. KRIZ: Yes.

MEMBER WEENER: Okay. Thank you.

CHAIRMAN HERSMAN: Member Rosekind?

MEMBER ROSEKIND: Captain Middleton, I'm going to start with you. You were going through the guidance for a non-precision approach and it seemed almost every other line was this is important, this is critical. What do you emphasize as kind of the top demands, the top performance aspects of the non-precision approach? I mean, you covered speed and programming FMC and monitoring the minimum. I mean, what do you really need to emphasize there? Can you zero in for us?

CAPT. MIDDLETON: Yeah. When you look at that chart, there's really three things that are absolutely critical, that is, one, you load the approach properly and you set in the minimums. And then you have to take an active step to activate it, which actually tells the computer that I'm going to do an approach now. So there's step two; that's physically pressing a button. And the third thing you have to do, you physically have to press the profile button. Now, in amongst all that, the other thing that's going on is that the crew has to manipulate the aircraft down slow, configure, and get checklisting done. But those three items have to be done or it won't work.

MEMBER ROSEKIND: So let me shift to Captain Laurentz. Tell us about the training, basically, that emphasizes those things. Some of us had a chance to listen to sort of what was

actually going on, and, in fact, it sounds like some people will literally just read the guide. I mean, it's like line-by-line reading the guide. And what you're saying is it's great to read every line, but you've got to really emphasize a few things. What's in the training that's available that emphasizes the really sort of critical elements here?

CAPT. LAURENTZ: There's certain elements associated with the qualification standards. So, within the qualification standards there's certain tasks. So those elements that Captain Middleton just referred to, at some level, would be addressed in a qualifications standard. So, if there was a deviation from that expectation, the crew would be debriefed on that.

And so any approach, whether it's a non-precision or a visual or a precision approach, we have multiple opportunities, whether it's initial training or recurrent training, to observe crew members conducting these type of approaches. As well as in line operation as well, certainly if it was an instrument approach.

MEMBER ROSEKIND: Captain Middleton, in response to some questions Captain Laurentz answered, it sounds like we're about to do some groundbreaking research. You reported that you did two non-precision approaches last year. I imagine you did more than two landings. Could you tell us sort of -- you know, tell us how many landings so we can actually get a percentage of your

experience from last year that involved non-precision approaches.

CAPT. MIDDLETON: How many landings?

MEMBER ROSEKIND: Yeah. Those two non-precisions were in how many last year of your landings?

CAPT. MIDDLETON: Oh, a couple hundred. I mean, more, more so than that, yeah.

MEMBER ROSEKIND: Right. So we're at 1 percent?

CAPT. MIDDLETON: Yes. It's very fair to say that, yes. I mean, I think the numbers that I gave you -- I'm a line pilot also, and I speak to the other line pilots and other instructors, and they'll tell you the same thing. It's not pulling out of thin air those numbers. It's just what we have evolved into. Most places we go have ILS's, and the majority of the time, the conditions are such that we don't even need that. The conditions are visual. So the majority of the time we're doing a high level precision approach or a visual approach being backed up by a high level. And there are just other times, a very small amount of times that it occurs.

MEMBER ROSEKIND: So that's why I wanted to shift to Captain Laurentz, because what I heard -- my question to you was going to be, so what's the base rate, what's the usual average that crew members are going to actually see a non-precision approach? I think you answered that there's no data collected about this. So what that moves us to is, you know, it's great to talk about your 1 percent, but I'm curious, do you have any sense

or how would you -- it sounds like the FAA doesn't collect data about this either -- how you know how often folks are actually being confronted with having to perform a non-precision approach; how rare is this?

CAPT. LAURENTZ: Generally speaking, it's rare, just as Captain Middleton indicated. There's certain airports that that is the primary approach. So if you're a crew member who routinely flies in there, then obviously you would be the exception rather than the rule. As a result of that, though -- we recognize that, and I'm not sure that putting a number or percentage on it would drive us to a different place than where we are today. And as a result of that, we have an opportunity in AQP, it's called First Look. And what that First Look is, it's our very first simulator that we have the opportunity to give crew members things that we don't prebrief. They walk in and essentially they walk in cold and they start flying a variety of different maneuvers in a very realistic environment. It's not unrealistic at all. We try to replicate line operations, and we collect data on that.

Last year on the A300, that was one of our First Look maneuvers, was a non-precision approach with a nominal threat, and all but 2 percent performed to qualification standards. We also, in 2014, we added an additional non-precision approach, and we're up to five. Five of the 11 approaches that a crew member would see are non-precision approaches.

MEMBER ROSEKIND: And do we have any data on these two

particular crew members on their experience, in the last year or over their careers, with non-precision approaches?

CAPT. LAURENTZ: We do have data relative not to line operations, but clearly we have data associate with our training programs, as we do with all crew members. And we have an opportunity and a responsibility, quite frankly, that if a crew member exceeds a certain norm, that they receive additional training. Once they go into that additional training mode, they are either recommended or -- perhaps it's a mandatory, what's called special tracking, where they get additional training. Instead of coming back every 12 months, they'd come back at the 6-month mark and they would be retrained on those specific items.

MEMBER ROSEKIND: Right. And I guess that was kind of the point I was trying to understand here, is that you have the training part of this, but this is a pretty infrequent actual operational demand for folks, and we don't really even have data beyond your training on how much experience these people had; is that right?

CAPT. LAURENTZ: Not the quantity, if you will, but I would suggest that the quality, we do have information on that. We have a number of different data streams that come into us, whether it's ASAP, which is a voluntary reporting program from our pilots; we've got FOQA data, which FOQA in and of itself, what it does is it measures aircraft performance.

MEMBER ROSEKIND: Yup.

CAPT. LAURENTZ: We don't actually have a way of capturing was that a precision or a non-precision approach relative to FOQA, but what the FOQA gatekeeper will do is they'll look to see if there was a substantial deviation from a qualification standard. And if there was, they'll call that crew member up, determine what the conditions were, and perhaps it was a non-precision approach, in which case then they can recommend additional training. And we also have event reports and we've got our relationships with our check airmen and pilots in general. So, while we can't say what's the percentage, we can quantify the risk or lack thereof associated with a non-precision approach. And if I could --

MEMBER ROSEKIND: You can do it quickly, because we're way past time, so -- go ahead.

CAPT. LAURENTZ: A non-precision approach in and of itself is not a high-risk maneuver. If you compare it to a precision approach, it's more challenging. There's some interfaces relative to the crew member teamwork and a couple more steps as it relates to interfacing with their automation. But we fly into thunderstorm activity, areas of thunderstorm activities -- we don't fly into thunderstorms -- but we fly into icing conditions, we fly into runways with contamination. We train our crews to manage these aspects of aviation.

MEMBER ROSEKIND: Thank you.

CHAIRMAN HERSMAN: Vice Chairman?

VICE CHAIRMAN HART: Thank you. I think this question was asked before but not specifically to Captain Laurentz, so I would like to ask this question. This is a question from Member Weener. What happens if I'm above my airplane-generated glide slope and now -- what's the training regarding how to respond if I'm above the airplane-generated glide slope when I'm inside the final approach fix? What's the training for that?

CAPT. LAURENTZ: Really, the only way you could -- assuming that it is not a visual approach, assuming it is some sort of either a precision or a non-precision approach, the appropriate remediation for that would be to discontinue the approach, whether that's a go-around or discontinue itself, and get yourself back into a position so that you are stabilized. Because, quite frankly, you would be in a regime that you had not prebriefed, which would be an unmitigated risk factor between two crew members flying. One person may or may not understand exactly what's going on, so that would be a risk factor that would need to be mitigated.

VICE CHAIRMAN HART: Do you have any sense -- do you have any knowledge from the various reporting programs, the ASAP programs and the FOQA programs, do you have any knowledge of how frequently that occurs that people get above the airplane-generated glide slope and then try to respond to it in some way? Do you have any scenarios coming through your reporting systems in that regard?

CAPT. LAURENTZ: If there are any events such as that, the percentage would be exceptionally low. There are other things that are higher on the radar scope, if you will, in terms of activity that would generate remediation, whether it's programwide or individual crew-memberwide.

VICE CHAIRMAN HART: Okay. And let me ask about the callout, the training regarding callouts. When you're IMC, most of the callouts, I assume, relate to things like minimum descent height or decision -- minimum descent altitude or decision height. To what extent are the callouts related to altitude above airport elevation versus altitude above procedure-generated altitudes?

CAPT. LAURENTZ: I think if I understand the question, the 1,000-foot call and the 500-foot call would be in relation to the airport, so it would be essentially above touchdown elevation.

VICE CHAIRMAN HART: And what's the training regarding callouts above the MDA or the decision height?

CAPT. LAURENTZ: Well, in that case, the crew members are trained to call it out in relation to either the radio altimeter, if it's a precision approach, or the barometric altimeter, if it is a non-precision approach.

VICE CHAIRMAN HART: So my final question is kind of for the whole panel. I commend the entire commercial aviation industry for taking great steps to make sure that every airport that has airliners going into it, big airplanes going into it has precision approaches that they can use. I query whether there's

an unintended consequence of that of making people so rusty at non-precision approaches that we run into this problem. I just ask you that, ask any of the panelists to comment on that.

Yes, please, Captain Middleton.

CAPT. MIDDLETON: Well, I just think that's the evolution. I mean, that's what's occurred. It's the things that were designed to help us, down the road tend to sometimes hurt us because we become complacent or we don't -- you know, so I think it's the natural evolution, what you're taking about, that more and more and more we find places where we can do an ILS and we can fly fully automated, but 25 years ago we weren't doing that; we were actually holding onto the airplane. So, yes, I agree with what you're saying, that that's the unintended consequences of it, potentially.

VICE CHAIRMAN HART: Any other thoughts from the panelists?

CAPT. LAURENTZ: I suppose I have a slightly different perspective, while on one hand I certainly agree with Captain Middleton. As a result of automation, non-precision approaches actually have become safer than they were 10 or 15 or 20 years ago. Because of automation, we can now essentially create our own near-precision approach, using the profile mode as an example. On the aircraft that I fly, the MD-11, even in vertical speed it is a near-precision approach.

So, while it is a maneuver that is not normally called

for, automation actually does help us significantly relative to 10 or 15 years ago, and our data streams don't indicate that it's a significant problem, and our training -- and the training data would suggest that as well.

VICE CHAIRMAN HART: So what's the training regarding using the automated approaches, either precision or non-precision? We've talked about -- we assume that's happening when you're IMC, but what's the training regarding using those approaches when you're VMC?

CAPT. LAURENTZ: The normal protocol would be that we would shoot and be cleared for a VMC, or in this case I'm going to paraphrase and say a visual approach, but we always back it up if there is an instrument approach available. The primary or preferred method would be back it up with an ILS, which is a precision approach, but if there isn't one, then we would back up that visual approach with a non-precision approach.

VICE CHAIRMAN HART: Okay. Thank you.

CHAIRMAN HERSMAN: Mr. Bower provided an opening statement and there were a couple of pieces of information in that opening statement. One of them was that there were no anomalies identified with the aircraft or its systems, and that includes their Enhanced Ground Proximity Warning System. Another piece of information that he provided had to do with information that was recovered from the recorders, and it talks about a first impact prior to the alert, the terrain alert.

Can you help me to understand and reconcile those statements? What is expected with respect -- and what's trained for pilots, with respect to alerts? Does that change when they're in different phases of flight, for example, if they're in a landing configuration? And what do pilots know and expect as far as what alerts they might get and what time they might have to react to them? If somebody felt like they could answer the question, they could jump in.

Captain Middleton, you want to take it?

CAPT. MIDDLETON: I can only tell you as pilots we are very mechanical in that if I showed you all the manuals that I was responsible for today when I go out and fly, it would scare you. There's a lot to understand, and everything we do is proceduralized, every call we make, every button we push, and we have to be that way because we don't always fly with the same people and we don't always fly into the same places.

So when you ask me what the response is, I can only tell you that the Aircraft Operating Manual is a book that I'm supposed to know so well that if somebody shined a flashlight in my face at 4 in the morning while I was asleep and kicked me and said, "What are you going to do when the CFIT goes off?", I'm supposed to say I'm going to disconnect the autopilot and put the nose 20 degrees and take the autopilot off and all the throttles off, just like that.

I can tell you right now that the AOM tells me that if

it says sink rate, I'm supposed to adjust the flight path and stop what -- you know, make it stop what it's doing. But if it says "Too Low - Terrain," I'm going to do a go-around. And if it says "Terrain, Terrain, Pull Up," I'm going to do the CFIT escape maneuver. So that's all I have as a pilot at 4 in the morning, when I'm tired. I'm proceduralized, and we, as pilots, we do what's written.

I do completely agree that there's a part of it that you have to know your environment. And we certainly have the latitude to think as well, you know, so that -- maybe try to think ahead of the computer, but --

CHAIRMAN HERSMAN: Captain Middleton, what I'm trying to get at is the expectation for the different alerts and if pilots are aware of, when they would get those, how much time they would have to respond, because obviously you're being trained with the expectation that you can respond. I want to understand what the knowledge or the expectation is regarding when they would get the alerts. In this situation we had first impact before the alert. Is that what you would expect as a pilot?

CAPT. MIDDLETON: No.

CHAIRMAN HERSMAN: So how much -- when you were going through your training -- and so, for example, at different phases of flight, how much warning would you expect to receive?

CAPT. MIDDLETON: Well, from the Enhanced Ground Proximity Warning System, if that had become active, it can give

you as much as 30 to 40 seconds notice if it falls within its parameter.

CHAIRMAN HERSMAN: Okay. Maybe I could go to Airbus and you could help me answer this question. Please explain what you all understand about that there were no anomalies with the system. So explain how it's designed to work and how it performed.

CAPT. KRIZ: I must admit I'm a training captain and my knowledge of system design is very limited in that case. So I can give a very generic answer, that each of these warnings has a predefined envelope and has a predefined threshold of delivering the warning and that threshold depends on the phase of flight, and that threshold also defines the remaining time for reaction.

CHAIRMAN HERSMAN: So, when you train people, do the pilots understand that there are going to be different response times available to them depending on the different phase of flight or that certain systems would be inhibited or different in certain phases of flight?

CAPT. KRIZ: This is part of the technical training where the system parameters and the system definitions are explained. In the practical training we do at Airbus, we train the most critical conditions and the most critical alerts in terms of handling the aircraft as a response to that alert.

CHAIRMAN HERSMAN: And what would you say the most critical conditions and the most critical alerts are on an approach to land in IMC conditions, a non-precision approach?

CAPT. KRIZ: Under these circumstances, during night, in IMC, anything that is happening close to the ground is to be considered as critical.

CHAIRMAN HERSMAN: Member Sumwalt?

MEMBER SUMWALT: Thank you.

Captain Laurentz, a moment ago you said that the non-precision approach is not as high -- is not really necessarily a high-risk maneuver. Are you familiar with Flight Safety Foundation data that show that the accident risk is five times greater for commercial aircraft flying a non- precision approach compared to those flying a precision approach?

CAPT. LAURENTZ: I am. And when I was responding, it was in relation to other risk factors that we've identified, whether it be through ASAP or our training program.

MEMBER SUMWALT: Thank you.

I'd like to now call up Exhibit 2-Zulu, and I'd like to just scroll through that, beginning with the title of it. And, Captain Laurentz, this will be for you as well.

Okay. So what this is, is the Flight Operations Manual for UPS and it talk about stabilized approach criteria. Now let's scroll to the very next page, and up top here, and in the middle part. So let me ask you this. What type of approach would you consider these pilots to have been flying on approach into Birmingham? It would be called what; a localizer approach?

CAPT. LAURENTZ: Yes, they were shooting a localizer

approach in the vertical speed mode.

MEMBER SUMWALT: So if we go to the middle section here, and this is again defining stabilized approach criteria, where -- okay, so it says here if you're on an ILS approach, the localizer or glide slope indication reaches full scale deflection; if VOR approach, NDB approach, GPS approach. Where in this section would it tell you that if you got a vertical guidance on the computer-generated data, if you got a full scale deflection on that, where would you find something like that to indicate that that would be an immediate grounds for a go-around?

CAPT. LAURENTZ: I'm not intimately familiar with the A300. I'm on the MD-11. So, I don't know that they have a specific guidance. I know that there is what they refer to as, like, a football.

MEMBER SUMWALT: Right.

CAPT. LAURENTZ: The vertical guidance, though, certainly -- which is consistent with all aircraft at UPS -- you would have a vertical speed indicator, and that would indicate in this particular case whether they were stabilized or not in reference to their feet per minute rate of descent.

MEMBER SUMWALT: Yeah, I'm not talking about the vertical speed.

CAPT. LAURENTZ: I'm sorry.

MEMBER SUMWALT: You know, we know as pilots that if you're, say, on the final approach fix and you get a full scale

deflection of a localizer or a glide slope, for example, that you're going to go around, you're going to execute a missed approach, something thereabouts, right?

CAPT. LAURENTZ: Correct.

MEMBER SUMWALT: So what I'm looking for is where's the specific guidance in the UPS documentation that shows that if you get a full scale deflection of this football, if that's what we're calling it -- I'll buy that term having flown Airbuses before -- where would it say that if you get a full scale deflection of that football, just like if you got a full scale deflection of a glide slope, you're going to go around? Now, I know you're not familiar with the Airbus, but this is generic UPS guidance. This is UPS's FOM. This is not specific to the Airbus. So do you have any guidance for that generically speaking?

CAPT. LAURENTZ: Oh, I understand the question now. I don't know, I'm not aware of specific guidance relative to that, whether it's A300 or the MD-11. So that would be something I would have to go back and research.

MEMBER SUMWALT: Captain Middleton, can you answer that question?

CAPT. MIDDLETON: In the briefing guide for the profile approaches, it does tell you what the parameters are for non-precision approaches, the various ones.

MEMBER SUMWALT: In the briefing guide, that's what we referred to earlier, the matrix?

CAPT. MIDDLETON: No, it's at the end. It's at the end of the briefing guide.

MEMBER SUMWALT: Okay. Thank you.

Captain Middleton, how do you train for, say, the CFIT escape maneuver? Back in the years ago that I was flying, when we wanted to demonstrate the CFIT escape maneuver, it would be the typical situation where you're going to point the airplane at Mt. Rainier and we're going to be at -- say, the top of Rainier is 14,000 feet, and we're going to be at 13,000 feet and we're going to drive towards that thing in the simulator and we're going to get that TAWS alert about 60 seconds out, and then if we keep driving, about 30 seconds out then we'll get the warning, and then we can actually execute the CFIT escape maneuver.

At UPS, do you train for the scenario that we're talking about here where we're on an approach and we actually get an EGPWS call, not a GPWS call but a TAWS callout, saying "Too Low - Terrain"? Do you specifically train that on the approach?

CAPT. MIDDLETON: To my knowledge, no, we've not done that.

MEMBER SUMWALT: Captain Laurentz, do you have any knowledge of that?

CAPT. LAURENTZ: We don't, and for a couple reasons. One, it doesn't exist within the capabilities of the simulator; and two, for us to navigate around that limitation we would have to drive the crews artificially low, for example.

MEMBER SUMWALT: Okay. Thank you very much.

CAPT. LAURENTZ: If I may, could I just -- when Captain Mills asked me the question relative to CFIT and sink rate, I probably could have pulled a better reference, and I appreciate that. A probably more appropriate reference would be, it says under CFIT -- and this is under the A300 AOM and it's consistent with the FOM language as well, but it's 02.01.02.02, where it says CFIT recovery maneuver. "The following must be immediately performed whenever the threat or inadvertent contact of terrain or an obstacle exists," and then it goes into the maneuver itself.

One of the things that I think is important is the distinction between an EGPWS callout, whether it's an alert or a warning, and a CFIT recovery maneuver. While one may generate the other, that is not the only exclusive way in which we would execute a CFIT maneuver.

MEMBER SUMWALT: Thank you.

CAPT. LAURENTZ: Yes, sir.

CHAIRMAN HERSMAN: Member Weener?

MEMBER WEENER: A question for Captain Middleton. What would the callouts have been expected to be on this approach, vertical speed approach, localizer?

CAPT. MIDDLETON: Well, they were planning to do a profile approach, a localizer, and the first standard call that you would have heard from them, the pilot monitoring would have,

as they crossed a point that was 1,000 feet above the field, would have said "1,000 feet," and I presume, "Instruments crosschecked, no flags," meaning that everything would have been okay. The pilot flying's response to that would have been to verbalize the minimums, which in this case were 1200 feet. So he would have said, "Decision altitude 1200 feet."

There would have been quiet at that point until the next point they crossed, which was 500 feet above the field. The pilot monitoring would have said -- and again, depending upon what they saw, but under normal conditions they would say "500 feet, on speed," meaning -- they're referencing the approach speed, and whatever sink rate they would see, which typically in the speeds the Airbus flies, it's anywhere from 700 to 900 feet per minute down.

There would have been silence again. At an altitude 100 feet above the decision altitude, which would have been referenced off of the barometric altimeter, so in this case, at 1300 feet on the barometric altimeter the pilot monitoring would have said "Approaching minimums." And then 100 feet later, as the altimeter wound down to the next 100-foot mark at 1200, the pilot monitoring would have said "Minimums." The pilot flying's response to that is very limited in this operation, this type of approach. It would either be, meaning that he saw something, he would say either "continuing, landing," or if he didn't see anything, "Go around thrust, flaps," which is the standard call that we have on

the Airbus to do a missed.

MEMBER WEENER: So, in this case, there was not a minimums call?

CAPT. MIDDLETON: To my understanding, no, sir.

MEMBER WEENER: And had there been a minimums call, the field would not have been in sight, so the go-around decision would have been made at that point?

CAPT. MIDDLETON: At minimums? Is that what you said?

MEMBER WEENER: Yes.

CAPT. MIDDLETON: That's correct. If done by the book, if at 1200 feet on the barometric altimeter, if nothing was seen -- when the pilot monitoring said minimums, if nothing was seen, the standard call should have been, "Go around thrust, flaps."

MEMBER WEENER: Is there any automated call for minimums out of the FMC?

CAPT. MIDDLETON: No, sir.

MEMBER WEENER: For Airbus, is that an option, to do automated callouts?

CAPT. KRIZ: Not on this generation of aircraft.

MEMBER WEENER: Not on this generation. Okay. We spent a lot of time talking about stabilized approach criteria and the policies for that. If the criteria force a decision, who can call for a go-around?

CAPT. MIDDLETON: Anybody. Either crew member could.

MEMBER WEENER: Either crew member?

CAPT. MIDDLETON: Yes, sir.

MEMBER WEENER: Is there what you would call a no-fault go-around policy?

CAPT. MIDDLETON: Absolutely. Yes, sir. It's written that way.

MEMBER WEENER: It's written that way. Okay. Thank you. No more questions.

CHAIRMAN HERSMAN: Member Rosekind?

MEMBER ROSEKIND: Captain Middleton or Captain Laurentz, both of you, possibly, is there an operational or training process to benchmark or compare your non-precision approach procedures to others, what Airbus would suggest or what other carriers are doing? Do you have a process just to get a sense of where you are?

CAPT. LAURENTZ: There is a couple ways in which we bridge that. One would be, as we submit our data into the FAA, I believe that then they assess our results, they normalize it, to my understanding, so that they have the opportunity to assess our data relative to the data gleaned from other carriers.

We also are very connected. While it's not a formal process, we are very connected through our counterparts at the various airlines, and we talk routinely, whether it's about how they may do a particular maneuver or accomplish a particular task, best practices, that type of thing.

One of the things that we did in November, I dispatched

a team to look at a couple different things relative to how UPS does this compared to our counterparts in the industry, and one was on pilot monitoring, one was on first officer engagement, and one was on automation policy. And that's not as a result of any direct concerns, but that is just an example of how we routinely benchmark ourselves on critical aspects of our operations.

MEMBER ROSEKIND: So, then let's just wrap this piece up for my question. Mr. Steinbicker, anything on the FAA side of how that's evaluated?

MR. STEINBICKER: Yeah, I apologize. That question is a little bit outside my area of expertise. We can either provide a response after, or my colleague coming up on the follow-up panel.

MEMBER ROSEKIND: And actually, if you want to just submit something to the record afterwards, that would be great.

MR. STEINBICKER: Okay.

MEMBER ROSEKIND: Good. Thank you.

CHAIRMAN HERSMAN: Vice Chairman?

VICE CHAIRMAN HART: Going back to the callout process, to what extent does that process differ for IMC versus VMC? I could ask that of both Captain Laurentz and Captain Middleton.

More specifically, what callouts would I anticipate in a visual approach? If I'm VMC, what callouts would I anticipate?

CAPT. LAURENTZ: As long as you're on an instrument approach, whether you're VMC or IMC, the callouts would be identical. And, in fact, even if you were VMC and doing a visual

approach, if you briefed that you were going to back it up with an instrument approach, which would be the norm, then those callouts would continue to be made.

VICE CHAIRMAN HART: Okay. That's helpful, because I guess I'd like to get some idea of the percentage of time that these approaches are conducted VMC versus a percentage of time they're conducted IMC. I'm just trying to get a sense of how frequently the callout process has to happen.

CAPT. LAURENTZ: The callout process happens essentially on every flight.

VICE CHAIRMAN HART: Okay. Captain Middleton, do you have any thoughts on that?

CAPT. MIDDLETON: No, I agree. We, you know, we always set up for, as we always say, set up for the worst conditions and hope for the best. And if it's VFR, as long as -- you know, we would fly the approach as if it was IMC and make the same procedures.

VICE CHAIRMAN HART: Okay. Thank you.

CHAIRMAN HERSMAN: Captain Middleton, you mentioned that there were three things that were necessary to attain the profile approach. Did they actually get the profile? Were they able to take advantage of that?

CAPT. MIDDLETON: The one step that wasn't done was cycling the approach correctly, from what we saw. They did load the approach. They did enter the correct minimums and activate

the approach, and even pressed profile, but what they didn't do was essentially clean things up, as we call it. It's basically so the only thing that's in the FMC is the approach itself. And without that one step, it wouldn't have worked.

CHAIRMAN HERSMAN: Okay. So they were never going to really kind of activate or intercept the profile?

CAPT. MIDDLETON: That's correct. It couldn't work.

CHAIRMAN HERSMAN: Okay, so an error of omission or commission as you're going through a sequencing of things and they're not going to achieve it. Do we have -- on the CVR is there any acknowledgement that they don't achieve the profile, that they aren't getting it?

CAPT. MIDDLETON: From what I've seen and what I read, there was an acknowledgement to the fact that the aircraft was not doing what they had expected it to do, and they actually did make mention that the profile didn't engage.

CHAIRMAN HERSMAN: Okay.

CAPT. MIDDLETON: So, yes, they did see that.

CHAIRMAN HERSMAN: All right. So, the profile didn't engage. Member Weener and the Vice Chairman asked Captain Laurentz a question about UPS, if they're not on profile, if they're not on the profile, if they're above or they're not on it, and you mentioned that they should execute a go-around; is that correct?

CAPT. LAURENTZ: That's correct, because they would be

executing an approach that they had not set up for.

CHAIRMAN HERSMAN: Is it a UPS procedure to execute a go-around if they are not on the profile?

CAPT. LAURENTZ: It would be. And if I could just qualify just for a moment. It is not all that unusual, for example, for us to, or any airline, to get a runway change, as an example. Or perhaps the intended approach is no longer available, maybe the ILS glide slope became inoperative or what have you. That's not all that unusual. And what we do in those cases is we set up for the new approach, set up for the new runway, whatever the case is, and then we brief those differences. It would not be acceptable to initiate one approach and then to essentially develop a different plan once the approach has already been initiated.

CHAIRMAN HERSMAN: All right, I just want to be clear. You're saying there is a UPS procedure for them to execute a go-around if they don't achieve the profile?

CAPT. LAURENTZ: It ties back to -- it's not as explicit as that, but what it does is it ties back to the briefing, and we have a requirement -- (a) we have a requirement to do the brief; (b), one of the elements that we are required to debrief is what kind of approach we're going to shoot and in what mode we're going to shoot it relative to automation. So, to comply with that, you would have to --

CHAIRMAN HERSMAN: But it's not a specific callout that

they're trained to?

CAPT. LAURENTZ: I think the answer would be no, based on what I understand your question to be.

CHAIRMAN HERSMAN: Okay.

All right. Could you please pull up Exhibit 2-X, page 11?

I'm going to follow up on some questions that were asked about different required callouts. And again, looking back at the cockpit voice recorder with respect to specific times, and also some of the other data that we have, recognizing that sometimes on the CVR the callouts are coming a little bit late because they've already passed through certain altitudes, when we look at this chart and we get the 1,000 feet above touchdown callout, there are a couple of other callouts, and Member Weener went through some of these, that needed to happen.

Captain Middleton, you were going through these and you said they'd call each of these out, there would be silence, then there would be another callout, and then there would be some silence, and there would be another callout. Which of these callouts were missed on the approach?

CAPT. MIDDLETON: From what I've read, the 500-foot call above touchdown did not occur, the 100 feet above the MDA did not occur, and then the call of minimums did not occur.

CHAIRMAN HERSMAN: So, as I'm looking at the CVR, when they're at 1,000 feet, the time when they make the callout for

1,000 feet is 4:47:02.9, "One thousand feet, instruments crosschecked/no flags." We hear sounds of first impact less than 30 seconds later, and in between those, you know, we've got the 1200 callout, but there's not a lot of time for all of these other callouts and responses and decisions. And so, my question is, is 1,000 feet, given how busy the cockpit environment is, enough time to execute all of the required steps in an IMC non-precision approach environment? Now, when you all do training and you practice this, can they hit them all the time?

CAPT. MIDDLETON: Yes. Yes. Properly configured, where the aircraft needs to be, while it seems as if they're coming, you know, right after each other, there's actually silence between each one of them, and so there is --

CHAIRMAN HERSMAN: Okay, properly configured, though, is kind of a key point here. What's properly configured at 1,000 feet?

We went through the six steps, landing configuration, airspeed, no more than 1,000 feet per minute sink rate, aircraft in a stable position vertical and lateral, 200 feet off the centerline, and thrust settings. They've got to be doing all of these things simultaneously, verifying all of these things, and what if they're not, what if they're not hitting one of these targets?

CAPT. MIDDLETON: Well, in the case of this one, at 1,000 feet -- and again, I'm going from memory -- I believe the

descent rate was in the neighborhood of 1500 feet per minute, which means it was two plus times the value that it normally was. So, in essence, things were happening two times as fast as they normally did. So, in this case, it could lead to a downstream problem.

CHAIRMAN HERSMAN: Okay. So we have a time compression due to the vertical descent rate that is in excess of what we'd expect to see at this point, and I believe Member Weener asked the specific question, was that alone, 1500 feet per minute, enough to execute a go-around?

CAPT. MIDDLETON: Yes, ma'am. That exceeded the stabilized approach criteria.

CHAIRMAN HERSMAN: Okay. Any other comments from the other panelists?

The Tech Panel has some additional questions.

MR. LOVELL: Thank you, Madam Chairman. Dr. Wilson?

DR. WILSON: Thank you. If you could pull up Exhibit 2-A, page 63, please?

Captain Middleton, while he's getting the exhibit pulled up, I'm interested in understanding what cues were available to the crew to alert them that the approach was not properly sequenced?

CAPT. MIDDLETON: Are you going to bring up the attachment that shows the picture of the ND?

Okay. All right. Remember, I said earlier that one of

the items that has to be done is that the approach has to be loaded into the FMC, and then -- which is the lower screen that you're looking at, which is showing you the nav display which corresponds with what the computer has. If the approach had been extended, as we used the term earlier, you would be missing the line that you see right now where the airplane is, down in the lower part of the center. Basically, the line that you see there is the last thing that the aircraft was navigating, which was a line from Louisville to Birmingham. Had they extended the final, that line wouldn't be there. So that would be a primary cue that something is amiss.

If they had extended that properly, just beneath the airplane to the left you can see what -- right now says .00 Left, because they're actually centered on that line. But the moment you extended the final, the computer would now be looking at the line for the approach, which in this case they would actually be to the left of that approach. So there should be some cue to them that I'm laterally left of that course. That should have been a second cue.

A third cue that's not visible here but down on the VMF itself -- and actually, you can see it in this picture. To the right of the screen there's a vertical deviation, or the football, as Mr. Sumwalt repeated, and you notice that there's a little V indice up on the top scale. And what that's showing them is they're actually beneath the predicted path that's out there. But

down on the lower screen in the airplane, they could actually see their distance from that in feet.

And under normal conditions that night, where they were right there, if they had extended the final, they would have been in the neighborhood of about 3,000 feet beneath a sloping upward glide path that they're approaching. But because they hadn't sequenced it properly, the number that they would have seen was a -9999, which is the Honeywell system's default of the highest number it can give, and it would have just been pegged on that, not counting down. And, of course, that's another cue that something is amiss.

1, 2, 3, 4 -- yeah, I think that's -- so there were multiple cues to show them potentially that something is amiss. Does that answer your question?

DR. WILSON: Yes.

If they could bring up page 65, please? Is this the display that you were speaking of with the vertical deviation?

CAPT. MIDDLETON: Yeah. Yeah, and at the bottom right where it says VD- -- and, again, that -9990 you're seeing is a default number that it starts out as, and in the position where they were when they got cleared for the approach, that number should be reading somewhere in the neighborhood of about -3400 feet, because they're approaching a path that's out there. And it will work its way down to zero as they join up on it. But in this case, it would never go down.

DR. WILSON: Okay. And if you could also bring up page 64?

CAPT. MIDDLETON: Thank you. Okay. This is the one that I couldn't remember. That is a listing of the flight plan, and basically each one of those points that you see that are named just show up as waypoints in the computer. But notice the one between the, after the -- you have a T-P, and then KBHM. There's a line there that's called a flight plan discontinuity, and again, I can't speak to the architecture of how the Honeywell system was built, but what I do know is that when you load an approach into the system, it automatically throws one of those in there, and I liken that to a log in the road. And what needs to be understood is that as long as that's there, the aircraft cannot sequence past it to get to that point, which is Colig. In fact, that discontinuity is so strong in this airplane that the autopilot won't even run over it. The autopilot will turn off when it hits it. So that would have been another cue that this is not -- or something is amiss.

DR. WILSON: Okay. And one more, page 54. Right there; the red circle on the ND?

CAPT. MIDDLETON: Yeah, my apologies for not seeing that one. The lower right screen circle is showing you the distance to the active waypoint in the flight plan, which in this case was Birmingham, because that's what they had been cleared to not long after they took off out of Louisville. Had they sequenced the

approach properly, that would be reading distance along that approach, not to the airport. So that would have, again, been another cue.

And the top left one is the ILS DME, which in this case, if they were going to be doing a non-precision approach without vertical guidance, it's another cue as to their distance. And basically, those two numbers are never going to marry up at this point, which the reality is those two numbers would eventually marry up pretty closely together if the approach had been cycled together. So there's multiple cues that it's not right.

DR. WILSON: Thank you. The Technical Panel has one more question.

CAPT. LAWRENCE: Captain Kriz, what is Airbus's procedures that they expect the pilot to conduct for a sink rate alert on an approach?

CAPT. KRIZ: The response to a sink rate alert on the approach depends on the condition of the approach and on the phase of flight. So under the assumption we are at night, we are in IMC, we are below minimum, the correct expectation to react to a sink rate alert would be a go-around.

CAPT. LAWRENCE: So the sink rate alert is environmentally dependent?

CAPT. KRIZ: The reaction of the sink rate alert depends on the situational awareness and, thus, it is dependent on the situation of the flight.

CAPT. LAWRENCE: And what does Airbus teach on the A300 as far as the pilot response for a "Too Low - Terrain" alert?

CAPT. KRIZ: The explanation given in the documentation is very much the same, that a "Too Low - Terrain" alert is normally replied with a go-around maneuver.

CAPT. LAWRENCE: And just to understand, the sink rate alert, I asked if it was environmentally indicating that in IMC conditions. What if the conditions are visual and they receive the sink rate alert on the approach, what would the response be?

CAPT. KRIZ: If the pilot can clearly distinguish that his position in relation to the terrain is acceptable and that he can make a maneuver to silence the sink rate warning in visual conditions, he might assess that the continuation of the flight is possible.

DR. BOWER: I just have a couple questions. If we could pull up again 2-A, page -- one of the last ones we had. I believe it was 54.

Captain Kriz, this is going back again to what we see here on the side of the nav screen with the vertical deviation where we have the indication at the top end of the range. Is there any other cues to the pilot -- and we also have the -999 on the other display, as described by Captain Middleton. Is there any other cues to the pilot that this is a valid value, or any other indication that would say, hey, this is -- there's something not right about this?

CAPT. KRIZ: Apart from the conditions and the indications that Captain Middleton mentioned, there is one more. If the pilot looks at the FMS progress page, there are two distances to be displayed. There is one, the so-called "flight plan distance to destination," that sums up the distances of all the waypoints contained in the flight plan, and normally the pilot selects in the bearing distance field the active runway he's going to fly. And in that situation, as shown here on the screen, there would be a mismatch between those two distances.

DR. BOWER: Okay. And, Captain Middleton, one other question. On this type of nav display where we have this extra line that's appeared, is that something that a crew may see if they're, say, they're performing an ILS approach and they're not going to utilize this profile mode and perhaps have a discontinuity in their approach as they set up, but they're going into an ILS type of landing?

CAPT. MIDDLETON: No. No, we load it the same way and we extend the final the same way. So that would not be normal.

DR. BOWER: Okay. So that should always -- that's something that shouldn't be there no matter what approach you're flying?

CAPT. MIDDLETON: That's correct.

DR. BOWER: Okay. Thank you. That's all I have.

CHAIRMAN HERSMAN: Thank you.

MR. LOVELL: Madam Chairman, the Technical Panel has no

more questions.

CHAIRMAN HERSMAN: Thank you to the Technical Panel.

I note that some of the parties, including TWU, passed. There looked like a period of time when you were actually interested in jumping in when there were some questions happening earlier. Are you all good? Okay. Any additional wrap-up questions from the parties? IPA?

CAPT. WHYTE: Thank you, Madam Chairman.

For Captain Laurentz, as a line captain, I would enthusiastically agree with Member Sumwalt that something that you do infrequently would definitely be more inherently challenging. And to tag on Member Rosekind's questioning about data points, you stated that we do have AQP training that relies almost exclusively on data points, and the more the data points the better. I'd like to ask you to clarify why you stated having data points for non-precision approaches would not necessarily matter. Thank you.

CAPT. LAURENTZ: I apologize, because I understood everything you said right up to the very question in and of itself.

CAPT. WHYTE: You mentioned to Member Rosekind that you didn't believe having additional data points to say that we shoot non-precision approaches somehow would really make that big a difference, and I would ask to clarify that.

CAPT. LAURENTZ: I appreciate that. The context of that response was data points relative to -- if I recall correctly, was

that if we could quantify the number or the percentage of approaches that we shoot that are non-precision approach in line operations, I'm not sure that that would drive us to a different destination relative to how we train and our SOPs and our expectations relevant to that. I believe that was the context of my response.

CAPT. WHYTE: Thank you, Madam Chairman.

CHAIRMAN HERSMAN: Any additional questions from the parties?

Thank you all for our cooperation. I know we're pushing. There's a lot more that could be said about all of these issues that you're being questioned on. Thank you for providing answers to the questions. We may have some follow-ups that will come from our staff, and we'll continue to work with you on those. It's now 11:28. We're going to take a 1-hour break for lunch. We will resume at 12:30.

(Whereupon, at 11:28 a.m., a lunch recess was taken.)

A F T E R N O O N S E S S I O N

(12:34 p.m.)

CHAIRMAN HERSMAN: Welcome back. We will now proceed with our work on the second panel. I will turn it back over to the Hearing Officer, Mr. John Lovell, to introduce and swear in the second panel.

MR. LOVELL: Thank you, Madam Chairman. Witness Panel 2 is already seated and ready to go. Panel 2 witnesses are composed of the following individuals: From my left, nearest the Board of Inquiry, Dr. Tom Chidester, First Officer Lauri Esposito, Captain Jon Snyder, Mr. Robert Burke, and Captain Larry Parker.

The NTSB Technical Panel is composed of, starting on my right, Mr. Romaine Bevillard, Dr. Dan Bower, Dr. Katherine Wilson, Captain David Lawrence, and Ms. Dana Schulze.

I will now ask that the witnesses please stand to be sworn.

(Witnesses sworn.)

MR. LOVELL: Madam Chairman, these witnesses have been prequalified and their respective experience and qualifications appear in the docket as exhibits in Group 1. I'll now turn questioning over to Dr. Katherine Wilson.

DR. WILSON: Thank you. Good afternoon, Madam Chairman and Members of the Board. If we could start with Dr. Chidester and move from -- move to my right, by stating your name, title and organization?

DR. CHIDESTER: I'm Dr. Tom Chidester. I am the manager of the Aerospace Human Factors Research Division at the Civil Aerospace Medical Institute in Oklahoma City, working for the FAA.

MS. ESPOSITO: My name is Lauri Esposito. I'm a first officer for United Parcel Service. I'm representing the Independent Pilots Association as the Fatigue Committee chairperson.

CAPT. SNYDER: I'm Captain Jon Snyder. I'm a Boeing 767 captain. I am the chairman of our Fatigue Working Group at UPS, and I represent UPS.

MR. BURKE: I'm Robert Burke with the Federal Aviation Administration. I'm a manager of the Air Carrier Training Systems and Voluntary Safety Programs Branch.

CAPT. PARKER: I'm Larry Parker. I'm the A300 fleet training manager, and I also oversee the CRM Advisory Committee.

DR. WILSON: Thank you. I'd like to start with you, Captain Parker. Could you please describe the CRM philosophy at UPS?

CAPT. PARKER: Yes. And if I can, while I start to explain that, can I ask to bring up Exhibit 14-Charlie, please? That kind of helps us out there.

I look at our philosophy here at UPS in kind of three categories. I look at it as far as our culture is concerned. I also look at it as far as our policies. And I also look at our training. If you take a look at our culture, our culture is --

we've been doing and practicing CRM for over two decades. We do our -- we practice CRM in our operation and we practice it in our training.

As you see, we have even a mission statement that we talk about our CRM that is so important to us. And if you like, I'll be more than happy to read that to you, or you can read it there, if you can.

When we talk about our policies, you know, it's all in our manuals. It's in our Flight Operations Training Manual, our Flight Operations Manual, our AOMs, even in our training manuals. When we talk about training, we're going to hit the important elements of CRM. We're going to look at standard operating procedures, decision making, and we're going to look at situational awareness. All those are very important to us, but it's our culture, it's part of our operations, it's part of our DNA.

DR. WILSON: And we learned in Panel 1 that the A300 training program operates under -- is under AQP. Could you explain how CRM and threat and error management is incorporated into training?

CAPT. PARKER: Yes. And if I can, I'd like to kind of take you from -- let me kind of take you as a new pilot at UPS and talk about how the training is. When you join UPS as a new crew member, you go to a company indoctrination for the first week. Part of that week, one day we have a 6-hour standalone CRM

training, which actually incorporates all of the basis of CRM, all the important elements, and give them the foundation of what they need to take CRM out to the line.

Our crew members are then assigned to their aircraft, and then we have an initial qual, and our initial qual program is a program that incorporates CRM in just about every phase of that. If you look at, 1 year, they come back for recurrent training and continuing qual. We also have CRM that's involved in that.

Then for crew members, new crew members who have been here for 18 to 36 months, we bring them back to a seminar called the Flight Crew Factors Workshop. Crew members had an opportunity to take those fundamentals of CRM, use them on the line, observe them; now they have a chance to enhance that through this seminar.

We also have another standalone CRM course, and that is our new captain and command course. That is a course for first time captains at UPS. They have a CRM training that they go through that is mainly focused on those main elements of CRM.

DR. WILSON: As a part of CQ, is fatigue included in CRM and threat and error management training?

CAPT. PARKER: Yes, it is. We include it in our continuing qual, in our recurrent training. We also, again, we talk about it in all the courses that I mentioned before, our new hire classes, our Flight Crew Factors Workshop, and we also talk about it in our new captain and command course.

DR. WILSON: What information regarding fatigue

management are crews expected to include as a part of the CRM safety briefing before each flight?

CAPT. PARKER: Can you repeat that question one more time, please? I'm sorry.

DR. WILSON: Sure. Crews are required to provide a CRM or safety briefing prior to each flight, and I'm interested in what sort of information they're required to include on fatigue management.

CAPT. PARKER: Well, I believe when you talk about the CRM safety briefing, we're going to include -- part of that briefing is to include any type of threats that may be part of that trip. If there is any fatigue that's involved or if a crew member is tired or anything like that, that should be brought up initially and right away. So that is part of that briefing, and it's part of a threat, as we look at it. So, hopefully, that's brought up in that briefing.

DR. WILSON: And what other sort of information is included in these briefings?

CAPT. PARKER: Well, if you look at our CRM safety briefing, that is done before engine start, before the aircraft even taxis out. It's an opportunity for the captain to set the tone in the cockpit, set the tone where there is communication, good communication. We talk about standard operating procedures. We talk about all the threats that may affect us in that flight, and there's threats in weather, ATC, anything like that. So, it

kind of sets the tone. It's a CRM briefing that sets the tone in the cockpit.

DR. WILSON: And how do these briefings help the crews prior to the flight?

CAPT. PARKER: Well, again, it helps us set the tone. It helps us to improve the communication in the cockpit, make it free flowing. We want to make sure that our crews are actively monitoring the safety of the flight. That's the most important thing, is the safety of the flight, so we want to make sure our crews have that free communication that will enhance our CRM in the cockpit.

CAPT. PARKER: And how do crews ensure that these briefings don't become so repetitive that they lose their informational value?

CAPT. PARKER: Well, I look at the CRM briefing, probably one of the most important briefings there -- well, I'd say all the briefings are important, but the CRM one, again, I go back to setting the tone. We have crews that fly together a lot, but we expect our crews to conduct a CRM briefing every time they fly, and it does set the tone. It actually continues to improve the CRM as far as the flight is concerned.

DR. WILSON: And in your previous interview you had stated that if the profile didn't capture on an approach, you would expect the flight crew to abandon that approach. And I believe in Panel 1 Captain Laurentz also alluded to the same

concept, but that's not in guidance anywhere. Do you know why that's not provided as guidance to flight crews?

CAPT. PARKER: I think that if you -- I think it's -- and I think Captain Laurentz kind of mentioned about it earlier on in the first panel, that anytime that we brief something that didn't happen and it is going to be a safety concern, we expect our crews to abandon that. I think that is good situational awareness as conducted in making sure that we conduct a safe flight. If things are not done correctly, we expect them to abandon the approach.

DR. WILSON: Dr. Chidester, once a crew starts an approach, what factors can affect how readily they recognize the need to abandon that approach and go around?

DR. CHIDESTER: Well, I think there are several things that you would look to. You have the standard operating procedures that are designed for a given approach, and you should see people briefed to those and adhere to those. When something changes, as it did here, it's a challenge, particularly for the pilot monitoring. It can become unclear as to what we're going to do next; I knew what I was going to do before and now we've got something that's got to change. I think I would hope to see the pilot flying in that case to very clearly verbalize what the intentions are and what I need the pilot monitoring to do in this particular case.

That is likely to produce a moment of confusion and a

moment of reorientation, and that's why I think you hear Captain Parker talking about the desire to see them just instead abandon an approach.

DR. WILSON: From a human factors perspective, is it easy for a crew to abandon an approach?

DR. CHIDESTER: It depends. There are several ways to look at this. If you look at the research that Judith Orasanu's done out at NASA, it would suggest to you that people are reluctant to abandon a plan as a plan that's going wrong and that sometimes you do see a perseverance in a course of action that you would like to see interrupted.

I think if you look at how approaches are planned, very often we should be thinking of the intention to fly an approach to a missed approach, and the missed approach should be part of the maneuver. However, there are risks associated with an unplanned missed approach as well. Those can go wrong as well. So I would hope that if we are seeing people plan an approach having in mind the missed approach, that alleviates some of the perseverance issue and some of the threats associated with that missed approach.

DR. WILSON: And back to you, Captain Parker. How does UPS instruct its pilots to monitor and crosscheck during the approach and landing phase of flight?

CAPT. PARKER: Well, we have what we call a pilot monitoring philosophy, and if you look at it in two ways, look at

it in pilot monitoring duties -- and it's spelled out in all our manuals. It's spelled out in our Flight Operations Manual and it's also spelled out in our Aircraft Operating Manual. We look at pilot monitoring skills, and those skills are trained in our human factors training. You know, we talk about visualizing, acting and comparing, and also verifying, and this is spelled out through all our manuals, the Flight Operations Manual as well as our Aircraft Operating Manual.

DR. WILSON: And who evaluates pilots' abilities to do this?

CAPT. PARKER: Well, we have, I guess -- under our standards and training model, when crews come back and do training in our continuing qual, it is one of the graded areas that we look at and that we monitor. It is part of our what we call our task analysis that have earmarked CRM throughout the whole training phase, whole footprint. We also look at it in our -- when we do line checks. So we do active monitoring. That's also part of our line check items that we look at, is CRM.

DR. WILSON: Thank you. Dr. Chidester, how good are pilots at monitoring?

DR. CHIDESTER: Well, historically, if you look at incidents and accidents, you would say there are some vulnerabilities there. But the industry and the FAA have really refocused over about the past dozen years on training and emphasizing monitoring.

As I look through these exhibits that we've seen, I see some real strengths here in the emphasis of monitoring. You see good definition of what the roles of the captain and the first officer is supposed to be, good definition down to the level of flying this particular approach as to what the roles of the pilot flying and the pilot monitoring are supposed to be. And you even see in the checking environment, in their AQP program, you see an articulation of grading scales that are tied to those roles and that are tied to threat and error management in general. So I would say there's a vulnerability, but I'd like to think that things are getting better with the emphasis that we see.

DR. WILSON: Are there alternatives to training pilots, such as considering changes to task design or checklists to help improve monitoring?

DR. CHIDESTER: I think that's possible. I mean, we heard this morning the automated callouts of minimums, the lights for minimums that are available on some aircraft. That's one way of getting around a vulnerability in monitoring.

DR. WILSON: And, Captain Parker, if a pilot monitoring misses a callout, how is a pilot trained to respond to that, the pilot flying specifically?

CAPT. PARKER: Well, if a callout is missed, the pilot flying is to make that callout. That is a part of our standard operating procedures. So if a call is missed, it has to be made by the pilot flying.

DR. WILSON: Is there a certain amount of time after a call is missed that that call is ignored, or would the pilot follow up soon after, as soon as possible that he recognizes that that call wasn't made?

CAPT. PARKER: Well, yes, if the call wasn't made, the first thing you do is make the call, because that's part of our procedures. And then we check with the pilot monitoring, find out to make sure that they have good situation awareness. It might have been a momentary distraction. It might have been anything. But I think it's important to confirm with the pilot monitoring to make sure they have -- they're on the same wavelength as the pilot flying.

DR. WILSON: And as the pilot monitoring, if the pilot flying made a change to an approach that was briefed, what would you expect the pilot monitoring to do?

CAPT. PARKER: Well, I would expect the pilot monitoring to first ask the question why, you know, why there was a change. And if there was a safety issue or any -- if safety is jeopardized in any point of that, the pilot monitoring could call a go-around or abandon the approach at that time.

DR. WILSON: Is this provided in any training, where a pilot flying may be coached to change a procedure which would then require the pilot monitoring to recognize that and respond?

CAPT. PARKER: I think if we look at our training overall, I think we are trained to look at all the safety aspect

of that flight. And anytime that safety is in question, or if there's -- in jeopardy, we expect any of the crew members in the cockpit to question it and to ask them to abandon the approach, or find out what's going on to make the situation awareness. It is under -- if we take a look at our pilot duties that are located in our FOM, it kind of spells that out.

DR. WILSON: And, Dr. Chidester, we've heard the word situation awareness used several times. Could you briefly describe what situation awareness is and its relevance to pilot monitoring?

DR. CHIDESTER: Briefly is a challenge. I like the approach that Dr. Mica Endsley has suggested, that you think about situation awareness as to whether I know and understand data, what I'm doing right now, what the airplane is doing right now, targets, the intermediate things that I'm going to carry out, and maybe long-term future course, where I understand what the implications of those other two things are and what I've planned towards. In terms of monitoring, I think very clearly we write monitoring duties towards monitoring data, crosschecking data. It becomes more ambiguous as you move towards the other two targets as to what the pilot monitoring duties are.

DR. WILSON: And to what degree is situation awareness influenced by communication/coordination amongst the crew?

DR. CHIDESTER: Well, it's certainly a big part of it. Information is distributed in the cockpit. There's no way around

that. It's distributed on different displays, and then things like intentions and plans are distributed between the two pilots. And it's that communication between the two of them that makes those plans known and makes deviations alerted and causes people to respond to those deviations. So communication is fundamental to it, along with standard operating procedures.

DR. WILSON: And is there research to show that if a crew has poor situation awareness, that then therefore they would have poor communication?

DR. CHIDESTER: I don't know that I would necessarily phrase it that way. Situation awareness is often a descriptive term and something that we talk about post-hoc. Describing it in real time the way Dr. Endsley does, I think, makes sense because it's something people can strive to do. I think the two things go together, that if you're maintaining good situation awareness, as she describes it, you will see communication about critical elements. I don't know where the cause and effect piece is.

DR. WILSON: You heard Captain Middleton in Panel 1 describe the various cues that would have been available to the crew that would have alerted them that they hadn't sequenced the approach right. What are the human limitations that might cause a pilot to ignore these cues or dismiss them as being relevant?

DR. CHIDESTER: Well, human beings are limited processors of information. We see what we're focused on, we see what we need to do according to the plan that we have in place,

and then we look for things that are clearly deviations. The things that we saw this morning are deviations. They weren't picked up. It happens. People make mistakes. There's sometimes more information available than you can completely process, and so you focus in.

DR. WILSON: And, Captain Parker, could you briefly describe UPS's policy on standardization and use of standard operating procedures?

CAPT. PARKER: Well, the standard operating procedures, it's part of -- it's an important element of CRM. It is mandatory. Standard operating procedures are policies and procedures that we have been practicing for the last two decades, policies and procedures that are part of UPS. We also look at the industry standards as far as our policies are concerned.

It is spelled out in our manuals. It is part of -- it's integrated in just about all our manuals when we talk about standard operating procedures. And it's trained and it's evaluated.

Probably the most important item on there is that it is mandatory, and we spell that out in our FOM in 02.02.06.01, and we could bring that up as an exhibit, if you like, but it is mandatory that we do standard operating procedures.

DR. WILSON: How well are UPS pilots adhering to standard operating procedures in required callouts in your experience, not only flying the line but also in training?

CAPT. PARKER: They do a very good job. You know, according to our data and line checks, according to what we see in training, the majority of our pilots do an outstanding job when it comes to standard operating procedures and abiding by it. We feel that if -- we take a close look at it. We monitor it all the time. But to answer your question, yeah, I think we do a great job with that.

DR. WILSON: And as a captain, how do you personally handle deviations from standard operating procedures when you're flying with another pilot?

CAPT. PARKER: I address it right away, you know, and that is part of -- first of all, it's mandatory, as I mentioned before. And if a crew member that I'm flying with doesn't stick with the standard operating procedures, it has to be addressed right away.

DR. WILSON: You mentioned data from line checks or simulator observations. How does this data become available to you? How are you made aware of any deviations to standard operating procedures?

CAPT. PARKER: Well, we have a couple of ways to do that. We have, you know, we have our FOQA. I think we mentioned that earlier. There's data from there. We also have our ASAP reports. We have pilot reports we call event reports that are brought into it as data. So we take all those inputs to monitor where we are with our standard operating procedures.

DR. WILSON: And, Dr. Chidester, from a human factors perspective, how does standard operating procedures provide a structure or team framework that improves safety of flight?

DR. CHIDESTER: Well, I think they're foundational. It is the thing that allows the interchangeability of crew members.

DR. WILSON: And what kind of degradations can occur if SOPs aren't followed?

DR. CHIDESTER: You certainly create ambiguity for the other pilot. You can have something that one pilot is depending upon that then is not present. So, if some piece of information is necessary to a decision and that information is not communicated, that decision can become compromised or fail. What you see then put in place by airlines are what you would call layers of protection or safety nets. And as you look at things like non-precision approaches, you heard Captain Parker talk about if a callout is missed, I expect the other pilot to raise that callout. You also have things like the stabilized approach criteria which are intended to provide another layer of protection, and then following behind it you have things like systems, like EGPWS.

DR. WILSON: Captain Parker, are you familiar with the FAA's Advisory Circular 120-71A, Standard Operating Procedures for Flight Deck Crewmembers?

CAPT. PARKER: Yes, I am.

DR. WILSON: Has UPS implemented the guidance published

in that advisory circular?

CAPT. PARKER: Yes, we have done the guidance for stabilized approach criteria, yes, we have. To answer your question, yes.

DR. WILSON: In what ways have you implemented it?

CAPT. PARKER: Well, as our standard stabilized approach criteria that we talked about in Panel 1, it's implemented in our FOM. It is adhered to by all of the items that we talked about in Panel 1. So it is part of our procedures. It's in our FOM.

DR. WILSON: You mentioned that you are the chair of the CRM Advisory Committee?

CAPT. PARKER: Yes, ma'am.

DR. WILSON: What is the purpose of that group?

CAPT. PARKER: The CRM Advisory Committee, and sometimes called a steering committee, is a committee that is made up of both our IPA pilots and also management pilots. It is part of -- each fleet is represented. What we do in those committees, we review CRM issues, we review training programs. We also discuss implementing different themes that we do every year. We have themes for our continuing qual that we use, some of the basic elements of CRM. And most of these are recommendations, and what we do is recommend them to our director of training, Captain Laurentz in this case, and do get them approved, and then we are part of implementing and designing those programs.

And I might add, if I could, that we've been doing this

for almost 10 years, this committee, and it's been a great working relationship, both with the Independent Pilots Association and the pilots, our management pilots, and I think we -- it's probably something that has really enhanced our CRM program.

DR. WILSON: And what recent recommendations has the CRM Committee made to the training department?

CAPT. PARKER: Well, as we do every year when it comes to our continuing qual, we have recommended what our themes are for the coming year. Like this year our theme is automation, and the automation is part of our continuing qual. We implement that in just about every phase of our footprint. For next year, we have recommended, and actually has been accepted, is pilot monitoring, and those are just one of the things that we do as one of the recommendations.

DR. WILSON: Have there been any changes or discussions about changes to training since the accident?

CAPT. PARKER: What we have done, we have talked a little bit more about pilot monitoring in our -- this year's, 2014, continuing qual. We have been going out to do some benchmarking with the industry, and I think Captain Laurentz talked about that on Panel 1, and we talked about pilot monitoring and automation. And we have taken a look at those in compared to our operation, and that's still in design. We're looking at where we can take the best practices from the industry. So that's probably what we've done since then.

DR. WILSON: And, Dr. Chidester, from the literature, what does the research show is the nominal reaction time for a pilot to respond to an event?

DR. CHIDESTER: It depends on what it is. To give you an example, there's some research that's come out of our technical center in New Jersey looking at where controllers communicate to pilots a potential for collision with either another aircraft or with terrain, and there's some good estimates on that. You often see, once the clearance has been delivered, you often see 2 to 5 seconds time before the aircraft is making its maneuver to avoid a collision. If you get to EGPWS, I don't know the literature well enough in that area. I don't know that anyone's done a study to see how quickly people respond.

DR. WILSON: In response to what you said about the EGPWS, the systems report indicated that if this airplane had the advanced EGPWS or the updated EGPWS software, that the "Too Low - Terrain" warning would have occurred 6½ seconds sooner than when they got it, and if the crew had performed a CFIT maneuver, they would have had about 2.4 seconds to initiate that maneuver after receiving that alert. Is 2.4 seconds adequate time to respond?

DR. CHIDESTER: Well, maybe, maybe not. On the maybe not side, if you look at some of the other literature, that's not much time for people to react and respond. On the other hand, if all you needed was 100 feet or all you needed was 10 feet, that lead time, that warning time might be advantageous.

DR. WILSON: And what research has been done to reduce the number of approach and landing accidents?

DR. CHIDESTER: Well, there's been quite a bit done, and some of it's research and some of it's operational implementation. Captain Sumwalt mentioned this morning the Flight Safety Foundation study, which I think was very fundamental of this, that occurred back in the '90s, where you could see that we had a very rare type of approach, a non-precision approach that was accounting for very much an overrepresentation of approach and landing accidents, and there was a great deal of discussion of what was involved in those accidents.

And since that time you have seen both research accomplished to try to document some alternative procedures, you've seen the FAA, the manufacturers, the airlines come together through CAST and develop the constant descent approaches that we've seen put in place. We've gone from a time when at the time of the Flight Safety Foundation study virtually every non-precision approach was dive and drive, and there were risks with that, to a time where just about all of the approaches in the United States that are non-precision approaches can be flown with a constant angle approach. So there's been both research and there's been a tremendous amount of movement in this industry to move towards the constant descent approach.

DR. WILSON: Thank you.

I'd like to address Mr. Burke now. If you could briefly

explain the new training rules for Part 121 operators?

MR. BURKE: Sure. A large portion of the rule is focused on stall and upset, and pilot monitoring is a large component of that, and the fourth largest component is remedial training programs, making them mandatory for 121.

DR. WILSON: Explain the new rule for pilot monitoring training. What's the expectation?

MR. BURKE: Sure. So you can see over the evolution of time we've increasingly increased our guidance on pilot monitoring through the SOP advisory circular or CRM advisory circular in LOFT, and this rule is the next step. So it has two requirements. One is an operational requirement for pilots to monitor when they're not flying the aircraft, and then the second is a requirement for air carriers to incorporate pilot monitoring training into their LOFT scenarios.

DR. WILSON: Dr. Chidester, in order to train for pilot monitoring, is it enough to include it in LOFT? Do we need classroom training on this, or is simulator practice enough?

DR. CHIDESTER: I think you'd want to see both things. You would want to see the concepts presented in a classroom environment, explain what we mean by monitoring, the standard procedures we've put in place that emphasize what needs to be monitored and when it does need to be monitored, that when you have those things that are not proceduralized, what the expectation is that you will raise something to the attention of

the other pilot, to the captain or pilot flying. And then you would like to see the practice and feedback occur in simulation. And then on a larger scale, you would like to see feedback on that through the data that's collected in the training environment, through the data that's collected on the line, and ASAP and FOQA programs to the extent that you can.

DR. WILSON: Captain Snyder, thank you so much for being here today. What does UPS train to mitigate the effects of fatigue?

CAPT. SNYDER: What do we train to mitigate the effects of fatigue? We have published an aircrew alertness guide in our FOM, and I believe that's Exhibit 14-F, if you'd like to bring it up. It was written in collaboration with a noted national fatigue scientist, Dr. Steven Hursh. It contains best practices before going on the road. It provides best practices while on duty. It provides best practices, best tips and recommendations for layover sleep. It's pretty thorough. It's actually written very well and is very aircrew friendly. But we do provide written guidance for our aircrew.

DR. WILSON: And specifically training, what sort of training do pilots receive?

CAPT. SNYDER: Sure. As Captain Parker alluded to, we have -- when a pilot first comes on the property, we have a basic indoc CRM. Within that basic indoc CRM there is a standalone fatigue module that was developed and taught on the foundations

that were developed at NASA Ames. When they come back in 18 to 16 months for the 2-day CRM class, the Flight Crew Factors Workshop, there's another standalone fatigue module for fatigue and countermeasures and those types of things are discussed again in an open forum in a classroom setting.

In addition, our crews get annual recurrent training. Fatigue is a part of that. It was included in the 2012 annual recurrent training, it was included in 2013, it will be included again in 2014 annual training. In addition, we require and provide annual training for our -- not only for our aircrew, but for our dispatchers, our schedulers, and our senior leadership management so that everybody's on the same page.

DR. WILSON: Please describe UPS's fitness for duty policy.

CAPT. SNYDER: We have a fitness for duty policy that is published in our FOM. You have a very nice excerpt of it in 14-A, page 12. It's succinctly sums it up. But, in essence, it states that a crew member will report fit for duty. We go as far as to describe certain situations that would make you not fit for duty: illness, certain scuba diving, certain times of giving blood; fatigue is specifically mentioned as a thing that could make you not fit for duty. So we describe that in our FOM.

We also put in our FOM our FRMP, our Fatigue Risk Management Plan, and that is Exhibit 14-E, I believe. And we think that the FRMP is so important we have included excerpts from

this in the annual training for aircrew members. Because if you can bring it up to page 3, I think it is, or maybe it's page 2, there's a couple of very important aspects of it that -- is that 14-E? I don't think that's 14-E.

There you -- scroll down, please. Well, you don't have that pulled up, so I'll just -- 14-E, the FRMP.

Anyway, we talk about the safety culture and the FRMP in it, and we specifically discuss our commitment to proactive strategy and we state the fact that our fatigue program is non-punitive. We discuss the fact that we recognize errors and that we share information and that there will be upper management participation. And we go as far as to talk about the fact that it is a shared responsibility between the company and the crew member, that fitness for duty is in fact a shared responsibility.

That is in fact the FRMP that is included in our FOM. You can scroll down a little bit and you can see that I've covered those points under the safety culture and the fact that we do in fact talk about the joint responsibility of crew member and the company for the fitness for duty part of it.

DR. WILSON: Explain more about the non-punitive part of the FRMP.

CAPT. SNYDER: Sure. If a crew member feels that he is fatigued, he can make a call to a scheduler at any time and he is immediately and without question removed from a flight status and put into rest. A scheduler can ask him, basically, three

questions. He can ask the crew member if they are -- understand you are unfit for duty for fatigue, that's one question. The second question that they can ask them is, is there anything we need to immediately know about now that we can fix for the next crew member going into that situation, such as a hotel issue or something like that. And the last thing we ask them to do is confirm that they will be fit for duty for their next scheduled activity on their schedule.

DR. WILSON: Ms. Esposito, does IPA care to comment on the non-punitive system?

MS. ESPOSITO: Yes, we would. I would agree with Captain Snyder regarding the fact that a crew member can remove themselves from duty and call the crew scheduler. The crew scheduler cannot challenge the crew member, but they can ask the questions that Jon alluded to. However, as far as considering whether or not the policy is punitive or not punitive, I would say that the crew force would view it as a punitive system in terms of the fact that if the fatigue call is deemed to be -- I don't want to use the word not legitimate, but sick bank debit, debit of their sick bank can occur as a result of a fatigue call. So it's not embraced wholly as a non-punitive system by our crew force.

CAPT. SNYDER: May I comment a little bit more, further on that, if that's okay? So that the Board understands how we operate, our crew members operate on a 13-pay-period annual schedule. Their pay is never affected. In the small percentage

of time where it is deemed that the crew member can be held accountable, the crew member's sick leave account can in fact be used as we would as a sick day. The sick leave account is set up in such a way that it's a benefit for the crew member, and that the crew member has the current pay period he's in plus two additional pay periods, so three pay periods, in order to restore that sick leave account, if he so desires, through additional flying.

DR. WILSON: Thank you. And I've just asked them to pull up Exhibit 20-A, which I believe summarizes the number of fatigue calls that UPS has received. Could you please explain these slides?

CAPT. SNYDER: Yes, ma'am. These are our 2013 system fatigue calls. We had a total of 138 fatigue calls in 2013. And to put that in perspective for you, we have a very professional workforce, very professional pilot crew. Our pilots flew approximately 123,000 flights in 2013, and we had 138 fatigue calls. That's less than 1/10th of 1 percent.

The No Debit, Debit connotation that you see up there refers to the sick bank, actual usage of the sick bank as a -- sick leave account as a sick day. In 96 of those cases, either through the company or through the Fatigue Working Group, of which I'm chairman of, we determined that the crew member was every bit in his right to make that fatigue call. In 42 of those cases the crew member had to use his sick leave account as we would a sick

day and we -- in other words, we held the crew member accountable for the fatigue call. It was something we deemed within his -- we deemed, I mean the Fatigue Working Group, which First Officer Esposito is a part of -- that we deemed that the crew member could have in fact managed his rest better.

You should also notice that of those 42, 12 of those calls were automatically counted as sick days because the crew member failed to go through the contractually mandated process for a fatigue call. So to think that this process is punitive in any way is a misnomer.

DR. WILSON: Ms. Esposito, how does IPA counsel its pilots who are debited for making a fatigue call on how to manage their off-duty time and be fit for duty?

MS. ESPOSITO: First of all, the IPA supports the crew member's decision to call in fatigued. They're the best person at that point in time to determine their fitness for duty. We are not. We're analyzing the calls, certain calls, after the fact and not --

CHAIRMAN HERSMAN: Ms. Esposito, can you pull the microphone a little closer?

MS. ESPOSITO: Oh, I'm sorry. As Jon alluded to, our crew members are very professional. They show up fit for duty. I do want to make one more comment, if I may, regarding the punitive aspect of it. When a crew member calls in fatigued, the fatigue call is researched with his attendance history, and he doesn't

receive a letter in his file, but there will be an exception made in his permanent report. Now if you think about a system like ASAP, for example, where a pilot has an altitude deviation, that process is completely isolated and kept away from their attendance record. So we have an issue with that in terms of being -- crew members view it as being punitive. They get dinged for it.

DR. WILSON: Okay. So, I maybe didn't understand your answer if you answered my question. What does IPA do to counsel its pilots who make these fatigue calls? I understand that you support the crew member, but if they've called in fatigued and it's been determined that it wasn't a legitimate, if you will, fatigue call where they are now debited their sick bank, what does IPA do to give guidance to its pilots to ensure that this doesn't happen again?

MS. ESPOSITO: Well, we consider every fatigue call to be legitimate that the pilot makes. They're the only ones that can make that determination. With the Fatigue Working Group, we work in a very limited range, and we're bound by the contract. So just because something is contractual or FAR legal, it may contribute to fatigue. What we do on the Fatigue Working Group is see if there are situations or circumstances beyond the pilot's control. But sometimes there are just very, very challenging days that the crew member calls in fatigued. It's within the bounds of the contract, and we -- it's a difficult decision; these are not real black-and-white decisions -- and they have to be debited sick

bank. We just counsel them to make sure they're fit for duty.

DR. WILSON: And what does that counseling include?

MS. ESPOSITO: You're a professional, just do the best you can to be rested for your duty period.

DR. WILSON: Captain Snyder or Ms. Esposito, how does UPS ensure that its pilots understand the fatigue policy?

CAPT. SNYDER: In 2012 was when the FRMP was published. That's when we were required to have one on the property. So we're talking pretty recent history with the fatigue program. It only goes back 3 years in the state that it's in right now. So we started out in 2012, during annual recurrent training in a classroom setting, showing our crew members the FRMP. In addition, we published what we call a must-read bulletin for our crew members that went out at the same time so that all crew members knew that this was in fact a new policy.

In 2013, we included the FRMP and the alertness guide as part of the annual recurrent training, and I have a copy of it here if you would like to see it at a later time. And in 2014, we're going back to the classroom-style discussion in discussing fatigue.

DR. WILSON: And, Ms. Esposito, what steps is IPA taking to assist its pilots to avoid fatigue before they make the fatigue call?

MS. ESPOSITO: Well, again, all of the pilots in the pilot group are professionals and we just -- we have again, in our

collective bargaining agreement we have a very limited section on our contract regarding steps taken for fatigue calls. Our basic duty when we address a fatigue call, we are not involved in root cause analysis, we're not involved in going back and looking at if we debited a crew member for a particular trip. We do not have the authority as the Fatigue Working Group to go back and change that trip. We do not have the authority to go back and change that scheduling practice.

DR. WILSON: I understand that from the Fatigue Working Group. What I'm asking is IPA as a whole, what guidance do they give their pilots beyond what's in the manuals to ensure that they're fit for duty? Do you give any additional guidance? I understand the Fatigue Working Group may not be able to do more than what's contractually obligated, but the organization as a whole.

MS. ESPOSITO: As a whole, we publish articles from time to time on fitness for duty and basically inform crew members if they're not fit for duty that they should call in fatigued.

DR. WILSON: Ms. Esposito, you had a chance to review yesterday the Mobile Devices Factual Report in which there were excerpts of text messages from the first officer indicating that she fell asleep on several flights the night before the accident. What I'm interested in is, is this unusual for pilots to fall asleep during flight?

MS. ESPOSITO: Well, napping during flight is not

sanctioned by the FAA; it's not legal to do that. From what I read from that transcript was that First Officer Shanding [sic] was extremely tired. She tried to, it looked like, tried to get some sleep during the daytime. Daytime sleeping is very difficult. When you're operating on the back side of the clock, the type of sleep that you get during the daytime is not always as restorative as nighttime sleeping, and it sounded like she had difficulty sleeping during the day and nodded off.

DR. WILSON: Would you expect a pilot who notices that they've fallen asleep in flight to call in fatigued?

MS. ESPOSITO: What I would say to that is the crew member may have thought that she was in a better position to operate that flight. One of the unique things about fatigue is the fatigued person is usually the worst person to self-assess their fitness for duty at the time. They often think that they are in better shape than they are to operate that flight. I talk to crew members from time to time on the phone or face to face. We have very candid discussions regarding fatigue, and a lot of times what I'll hear is, "I didn't know how tired I was until I got to the hotel," or, "I didn't know how tired I was until I was on the hotel van. If I had to fly that trip again, I would call in fatigued."

DR. WILSON: The first officer had 62 hours off in San Antonio 2 days prior to the accident. Is 62 hours considered adequate time to get enough rest and be prepared for coming on

duty?

MS. ESPOSITO: I would say yes, it was.

DR. WILSON: Have you ever called in fatigued?

MS. ESPOSITO: I have not.

DR. WILSON: Captain Snyder?

CAPT. SNYDER: I have not.

DR. WILSON: Captain Snyder, what tools does UPS use to ensure that its schedules are not conducive to fatigue?

CAPT. SNYDER: As you know, we operate under Part 121. More restrictive than the 121 rules is our collective bargaining agreement, which adds an additional lawyer of protection and safety for our crew members. As a matter of fact, within the collective bargaining agreement, close to 100 pages deal with scheduling and the operation of flight crews. It's almost one-third of the entire collective bargaining agreement. So while we don't use specific tools, we do use rules that were established at the time that that collective bargaining agreement was signed, and they're based on many of the concepts and research that came out of the best practices at the time.

DR. WILSON: And either Ms. Esposito or Captain Snyder, have you looked at the crew's schedule up until the time of the accident?

CAPT. SNYDER: State your question again, Dr. Wilson.

DR. WILSON: I'm interested in if you've looked at the crew's schedule at the time of the accident.

CAPT. SNYDER: Of the accident crew?

DR. WILSON: Yes.

CAPT. SNYDER: Yes. Afterwards, as part of our Fatigue Safety Action Group, which is another component of our fatigue program, we're mandated to look at the schedule for fatigue. So yes, I did.

DR. WILSON: And did this schedule meet the requirements that are listed in the IPA contract?

CAPT. SNYDER: Yes, it did.

DR. WILSON: Dr. Chidester, you've heard a lot about what the crew did or didn't do on the flight deck. From a human factors perspective, what factors do you think were working against this crew?

DR. CHIDESTER: Well, I would take a threat and error management approach to looking at the flight that they were flying going into Birmingham, their plan to fly a non-precision approach, and we know statistically from the discussions we've already had that that presents a risk. You see that UPS has put in place the procedures for the non-precision approach that are consistent with the CAST recommendations and FAA guidance, and we saw the crew prepare for that. So there's a threat that's present and you see the action that they take to prepare for that.

The fact that on this given day the weather is down near minima, and unfortunately they weren't aware of that; this is a real no kidding fly the approach to the decision altitude, and I

think the weather information that they had led them to believe that they were going to break out 1,000 feet above the field. That is a threat. We should prepare for it regardless of what the ceiling is.

Then there are things that are unique to this runway and to the localizer approach, and that involves the terrain that's present in the visual descent area of the approach there. You would know about that by flying into Birmingham and flying that approach before, or you would know about it by word of mouth from other pilots, or you would know about it from the Jeppesen chart, which shows the photograph -- the briefing page, photograph for that, which, you know, UPS was not required to provide to its pilots in this case.

CHAIRMAN HERSMAN: Dr. Chidester?

DR. CHIDESTER: Go ahead.

CHAIRMAN HERSMAN: Sorry. I'm going to stop you, and I know this was a bit of a setup on your end. I think we want to be cautious about trying to do analysis about this particular crew or this particular flight. And so maybe if we rephrase the question so that it's a little bit more generic and we talk about what threats could be present that any flight crew could face, okay?

DR. CHIDESTER: Okay. The rarity --

CHAIRMAN HERSMAN: Yeah, so I know we set you up a little bit there, but we're just trying to stay on this side of analysis and keep to facts.

DR. CHIDESTER: Okay, very good.

CHAIRMAN HERSMAN: Just maybe sharing your opinion about research that's been done, facts that you know about different risks.

DR. CHIDESTER: Okay. I guess we'd focus on the rarity of this kind of maneuver, which we've already talked about. We would talk about the fitness of the crew, their rest; those are issues to consider and bring up. And the risks of an unplanned go-around that we mentioned before. If you plan for a go-around, that's a safe way of getting away from an unstabilized approach. If you've not planned for that go-around, it can produce its own sets of errors.

DR. WILSON: Thank you very much. Captain Lawrence has some questions.

CAPT. LAWRENCE: Thank you. Just a couple of questions.

Ms. Esposito, do the pilots at UPS bid their own schedules?

MS. ESPOSITO: Say again, please?

CAPT. LAWRENCE: Do the pilots at UPS bid their own schedules?

MS. ESPOSITO: Yes, they bid their own schedules.

CAPT. LAWRENCE: Is there an opportunity for a pilot to trip improve if they get a schedule that they would like to improve on?

MS. ESPOSITO: We have a process, but it's a very

restrictive process and it depends if there is time available, open time available for them to make the trade or whatnot. We can't drop a trip. If somebody wants to eliminate a trip, they would have to get personal leave of absence from the chief pilot's office.

CAPT. LAWRENCE: On a monthly basis, how far out in advance does a pilot know what their schedule will be?

MS. ESPOSITO: Our bid periods are two 28-day pay periods, which comprise one 56-day bid period. So, roughly 60 days is what the bid period is, and we bid it probably about 2 weeks prior to that.

CAPT. LAWRENCE: And, Dr. Chidester, we heard this morning on Panel 1 a little bit about the expectations of what the pilots -- what UPS expects of the pilots if they get to the final approach fix and the approach that they briefed does not materialize, and the expectation that we heard from two pilots on that panel were that they should abandon an approach, and Captain Parker mentioned the same thing, that was an expectation as well. However, we also heard that there are very specific procedures that pilots are required to fly. For instance, there are required points in an approach that they have to be; 1,000 feet, they have to be stable. There's a whole criteria in their standard operating procedures what needs to happen at that altitude. However, we've been listening to expectations as far as what happens at a final approach fix if the approach doesn't

materialize. And my question is, would you get a more desired result out of a pilot if they're trying to comply with the procedure as opposed to an expectation?

DR. CHIDESTER: The way you phrased your question, the answer is yes. There are things that can be proceduralized readily and things that can't. That is, there are things you anticipate and things that you don't as you write procedures. I would wonder whether anyone anticipated the particular chain of events here and would have thought to proceduralize it. I would think instead that the airline, the industry have developed things like the stabilized approach criterion so that you have a layer of protection below that, a place that will protect a crew from any consequences of that disruption and confusion.

CAPT. LAWRENCE: I have no more questions, Mr. Lovell.

MR. LOVELL: Madam Chairman, that concludes the Tech Panel questions at this time. We may have --

CHAIRMAN HERSMAN: Does Mr. Bevillard have a question?

MR. BEVILLARD: Yeah. Thank you, Madam Chairman. Just a quick question, I guess, to Captain Parker. Going back to CRM in general, does UPS keep records or track of CRM assessment, or is it just limited to open discussions after simulator training?

CAPT. PARKER: That's a good question. Again, I mentioned earlier that we do our -- you know, we do grade and track CRM. One of the parts of our training is that we do what we call a facilitated debrief, and it's a debrief that is led by the

instructor evaluator that has a chance to come back and, CRM-wise, discuss how that training event went, all the goods things that may have happened, all the things they could have done better. So we use the facilitated debrief probably as the one that stands out for our training.

MR. BEVILLARD: Thank you. And I just have one last very quick question with regards to threat and error management. Does UPS provide their pilots with the specific guidelines to incorporate threat and error management into their operational briefings?

CAPT. PARKER: Yes, they do. We expect our pilots, when they finish training, and depending on what training it is, either initial training or continuing qual, they have the foundation of our threat and error management model. We want them to be aware of it, know it, and take it out on the line and use it.

We also have a tool, and if I can kind of show that to you in Exhibit 20-Kilo, and it talks about the Big 6, and this is a tool that they use to take with them. We actually make it in a Jepp-size portion that they can take with them on a flight. It's a great tool to use to talk about threats, talk about errors, talk about how you can put defenses up. And if you go to the second page, you can see where, again, we spell out how we use the defense model, and it's a model that we use throughout our training and also we use in our operation.

MR. BEVILLARD: Thank you very much. I have no further

questions, Madam Chairman.

CHAIRMAN HERSMAN: I know everyone in the audience is feeling a little fatigued right now. Hang with us. We're going to keep going. We're going to try to finish this panel. We're going to move to the parties for questions. This time we'll begin with IPA.

CAPT. WHYTE: Thank you, Madam Chairman.

Ms. Esposito, it seems like some of the questions that came about bounced around the FRMP subject, but I'd like to address it directly, please. The FRMP that UPS has by mandate of the FAA, is the IPA involved in the FRMP?

MS. ESPOSITO: As far as the FRMP, neither the IPA Fatigue Committee, the IPA Scheduling Committee, nor the IPA Safety Committee is an active participant in the UPS FRMP.

CAPT. WHYTE: So, as some of the questions have alluded to, is the IPA involved at any point after a pilot would call in fatigued?

MS. ESPOSITO: We do have involvement only in the fact that we have some negotiated language in our contract which forms the -- which laid the groundwork for what is known as -- you keep hearing the Fatigue Working Group, and that's what Jon and I work on together.

CAPT. WHYTE: And just for clarification, could you please explain once again what the Fatigue Working Group is and the purpose of it?

MS. ESPOSITO: What the Fatigue Working Group does is we will review certain fatigue calls, and these fatigue calls are the ones that have been initially recommended for debit by the chief pilot's office. And what we do is we look at these fatigue calls to see if there were circumstances beyond the control of the pilot which led to the pilot being fatigued and not fit for duty, and then from there, we will either make a debit or no debit determination of their sick bank. I keep saying debit or no debit.

CAPT. WHYTE: So, does the Fatigue Working Group have the authority to go back and change a pairing that resulted from a fatigue call?

MS. ESPOSITO: No. We do not have the authority to go and change any pairings. We work specifically on whether or not the fatigue call is debited or not debited. We can make recommendations, but we have no authority to go in and make any changes.

CAPT. WHYTE: What fleet at UPS has the highest rate of fatigue calls?

MS. ESPOSITO: The A300 fleet, the Airbus, has the highest number of fatigue calls within the UPS system.

CAPT. WHYTE: Thank you, Madam Chairman.

MS. ESPOSITO: Can I add one more thing?

CAPT. WHYTE: Absolutely.

MS. ESPOSITO: The number one reason for fatigue calls

on the Airbus result from bid package construction, meaning existing trips. That's the number one reason for the fatigue calls on the Airbus.

CAPT. WHYTE: Existing trips being trips that have not been altered in any way by the crew member?

MS. ESPOSITO: That is correct.

CAPT. WHYTE: Thank you, Madam Chairman.

CHAIRMAN HERSMAN: Sure. I just want to make sure that I clarify the answer that she gave. You asked her about the highest rate, and you said the highest number. Is the rate and the number the same thing?

CAPT. WHYTE: That was my fault, Madam Chairman. I just used the wrong word. She was correct on number.

CHAIRMAN HERSMAN: Okay. But is the rate -- is it the highest rate, also?

MS. ESPOSITO: Taking the data in the exhibit that was submitted on fatigue calls, it's the highest number of fatigue calls comes from the Airbus fleet.

CHAIRMAN HERSMAN: Right. His original question was the rate, and so I just want to go back, and if they are not the same, if they're not one and the same, what is the aircraft that has the highest rate of fatigue calls?

MS. ESPOSITO: It would be the Airbus.

CHAIRMAN HERSMAN: I see Mr. Snyder shaking his head. Is the data different for another aircraft?

CAPT. SNYDER: We do in fact, at a Fatigue Safety Action Group level, not at a Fatigue Working Group level, look at rate. What we have done is normalize the data against the number of aircrew that are actively bidding on that fleet. We normalize the data so that it does make some kind of sense so we can see if we have a significant difference in rate. She is correct, the Airbus has the highest number of fatigue calls. The Airbus -- and I don't have the data in front of me, and I can provide it for you, but the Airbus probably over -- and we look at that rate monthly -- probably had the highest rate 4 out of 12 months. The rest of the time it was spread over the other fleets that you saw and domiciles that you saw on the slide previously.

CHAIRMAN HERSMAN: Okay. If we don't already have that underlying information, if you could just provide it for the record, that would be helpful.

CAPT. SNYDER: Yes, ma'am.

CHAIRMAN HERSMAN: Thanks.

IPA, did you have any follow-up?

CAPT. WHYTE: I do, as a matter of fact.

Captain Snyder, you just referred to the FSAG. Is the IPA involved in the FSAG?

CAPT. SNYDER: IPA provides all the data that we look at, actually. The Fatigue Safety Action Group looks at every single fatigue call that comes in for whatever reason. And as part of the data that comes in is the event report from the crew

member explaining what in fact occurred. The IPA has input to the Fatigue Safety Action Group through the Fatigue Working Group. Many times Lauri and her partner will provide me with information that they'd like the Fatigue Safety Action Group to take a look at and analyze, and we do and we do respond back to them, as we do all crew members that make a fatigue call. We also get input from crew members via the ASAP reporting system, and the Fatigue Safety Action Group does look at those. And we have made changes to schedules based on aircrew input and the Fatigue Safety Action Group component.

CAPT. WHYTE: So you do take IPA data for the FSAG, but the IPA is not involved in the FSAG. Would in the future that be something that we could do since we're providing you with some of the data you're using, would be able to be part of the front-end process to change what you just said, which was you do use that and the data points to go ahead and change a pairing?

CAPT. SNYDER: Yeah. As long as we're talking about the Fatigue Safety Action Group, there's several components of it that are looked at. One is the crew member's event report; that's an important part of it. We look at the schedule as it was planned, as it was flown, to look for any pinch points. We also use a modeling tool as another component of the analysis of a fatigue call. The company takes the responsibility for the risk analysis and the changes to the schedules that need to be made. So, while you are correct, while the IPA does not sit on the Fatigue Safety

Action Group, they certainly have an input to it, and we do act on their inputs.

CAPT. WHYTE: And I'll ask clarification. In the hierarchy of this fatigue risk management plan, where does the Fatigue -- this FSAG sit compared to the Fatigue Working Group?

CAPT. SNYDER: The Fatigue Safety Action Group meets once a month. The Fatigue Working Group meets once a month. As Lauri pointed out, the cases that the Fatigue Working Group looks at are the ones where the chief pilot's office has initially decided that there's aircrew accountability for the fatigue call. Those are the ones that the Fatigue Working Group looks at. The Fatigue Safety Action Group looks at all of the fatigue calls. So the purposes of the two groups are actually parallel. There's no hierarchy of one over the other. The Fatigue Working Group doesn't report its numbers to the FSAG, and the FSAG doesn't report its status numbers to the Fatigue Working Group.

CAPT. WHYTE: So as a fatigue call --

CHAIRMAN HERSMAN: I think we're going to need to move on, and so if you want to wrap up?

CAPT. WHYTE: Thank you very much, Madam Chairman.

CHAIRMAN HERSMAN: TWU?

MR. PERSUIT: We have no questions.

CHAIRMAN HERSMAN: Airbus?

CAPT. HOSKINS: Madam Chairman, we have no questions. Thank you.

CHAIRMAN HERSMAN: FAA?

MR. DRAKE: Madam Chairman, we have no questions.

CHAIRMAN HERSMAN: UPS?

CAPT. MILLS: Madam Chairman, just one question.

It was mentioned, Captain Snyder, about the pilot exception report, and I think it was only a mention of fatigue items being captured. Could you maybe expand on the purpose of the exception report and the types of items that are captured and retained within it?

CAPT. SNYDER: Sure. The exception report that First Office Esposito alluded to is -- all crew members have an exception report. It's a management tool, and included in the exception report is everything from fatigue calls to, gosh, to sick calls, to training events, hey, even attaboys, thank you for doing a great job. It's a management tool that we use. It's good management of your people. It's not used as a punitive tool. It's a way to manage our people. So, many, many different things are included in that exception history that we keep on each crew member.

CAPT. MILLS: And just to follow up, does it ever help when surveying that exception report to help our crew members in any way?

CAPT. SNYDER: Yes. I'm involved in all processes of a fatigue call, and one of the early things that I do is take a look back to the exception history of a crew member and see if there is

an issue that a crew member may need help with, because we don't want crew members out there operating that, quite frankly, have something else going on in their lives or need some additional help with things. It doesn't happen very often, but occasionally it does.

CAPT. MILLS: No further questions, Madam Chairman.

CHAIRMAN HERSMAN: We'll move to the Board. Member Sumwalt?

MEMBER SUMWALT: Thank you.

Captain Snyder, as you're well aware, FAR Part 117 went into effect last month, and when the FAA published that rule, in the summary, the fourth -- third line of the summary says, "Fatigue threatens aviation safety because it increases the risk of pilot error that could lead to an accident," and Part 117 has a provision for voluntary implementation.

As I recall, on March 1st of 2 years ago, the then-DOT secretary met with executives from UPS and FedEx to urge voluntary acceptance and compliance with that regulation. Why did UPS elect not to go with the voluntary compliance, given that in the summary of the rule it says that fatigue threatens aviation safety because it increases the risk of pilot error that leads to accidents?

CAPT. SNYDER: You are talking way above my pay level. But what I can show you -- if you'll bring up 14-A, page 30, I can show you a comparison between 117, 121, and the collective bargaining agreement that we currently operate under.

MEMBER SUMWALT: Well, that's already in the record.

CAPT. SNYDER: That is.

MEMBER SUMWALT: So we can look at it. So what I'd like to ask for the record is if you could have UPS submit their explanation for why they elected not to comply voluntarily with Part 117. That's what I'd like to get, if you could take an IOU on that for us, please?

CAPT. SNYDER: Sure. I'd be glad to provide that for the record.

MEMBER SUMWALT: Right. And for the record, I believe FedEx also elected not to go down that route as well.

CAPT. SNYDER: That is correct.

MEMBER SUMWALT: Now, you mentioned a few minutes ago, when pilots call in fatigued, there's three questions that the scheduler will ask, and the last question that they will ask is can you -- will you be fit for duty for your next duty period; is that correct?

CAPT. SNYDER: Yes, sir, that's correct.

MEMBER SUMWALT: Now, within the last 10 days, the FAA's general -- or chief counsel issued an opinion. It was in reference to Part 117, but the question was does a crew member -- if I'm a crew member and I've got a four-leg trip, can I just sign something saying I will be good for the next four legs? And the FAA chief counsel's office says, no, you cannot attest to something that's going to happen way down the road. That was

their opinion. Now, again, they're talking about Part 117, but the same question comes here. When I pick up the phone and call and say I'm fatigued and my next duty period is going to be 48 hours down the road, how does UPS expect the pilot to be able to reasonably attest that they will be to be fit for that?

CAPT. SNYDER: We expect our crew members to manage their off-duty time in such a way that they're able to report fit for duty. I am familiar with the ruling that you're referring to. I did read it. You know what? And if they're not, they make a fatigue call and we remove them from flight status. It's that simple.

MEMBER SUMWALT: But they really can't answer that question and be honest with you or themselves based on what this conversation is; is that correct?

CAPT. SNYDER: I don't know. We haven't ever had an issue with that, to tell you the truth.

MEMBER SUMWALT: Okay. You mentioned in a slide that there were 138 fatigue calls last year, and then you gave some very large figure for the number of flights that are flown each year. But there's a difference. A fatigue call could account for 15 calls -- or 15 flights. If I call in sick for a trip, that could mean I'm not going to fly 10 flights. So that's not exactly an apples and apples comparison, correct?

CAPT. SNYDER: No, you are incorrect. It is an apples to apples comparison. Our crew members call in fatigued for a

flight. They do not call in fatigued for a series of flights.

MEMBER SUMWALT: Okay. Good. Thank you. Because I noticed that the -- okay, good. Thanks.

Do you know -- you said that you went back after the accident and looked at this accident trip pairing. I'm hearing different things. Has UPS analyzed this accident trip pairing to see if it would have been compliant with Part 117?

CHAIRMAN HERSMAN: Member Sumwalt, I'm going to stop you because you used the word analysis, and we're trying to stay away from that.

MEMBER SUMWALT: Okay. Well, I'm going to refer to the Exhibit 2-A, and I want to know if this is a true statement.

CAPT. SNYDER: Where are we at?

MEMBER SUMWALT: Because I'm hearing two things, and I want to get it straight in my own mind. Tell you what, I'll come back for another round on that one. Thank you.

CHAIRMAN HERSMAN: Member Weener?

MEMBER WEENER: Yeah, there was a slide shown using Jim Reason's Swiss cheese model, and it was intended to show the, basically the safety efforts or the efforts to pick up errors, trap errors, and so forth. All of this is kind of dependent on a couple of self-assessments, the self-assessment of an individual's fatigue and an individual's fitness for duty. And anybody can comment. What are the difficulties with a self-assessment of fatigue or a self-assessment of fitness for duty?

MS. ESPOSITO: One of the difficulties is, as I mentioned earlier, sometimes the fatigued person is the worst person to assess their fitness for duty. Oftentimes, and it's even taught in the upgrade CRM captain course, that oftentimes you overestimate your abilities when you're in a fatigued condition. Being fatigued can influence your situational awareness. Being fatigued impacts your logic and reasoning. And the fact that a lot of our flights occur during the backside of the clock, during the window of Circadian low, at the point you're at your maximum sleepiness, so sometimes it is difficult to determine your fitness for duty. You think maybe I can just push on.

Like I said, I talk to a lot of crew members, not only as the Fatigue Committee Chairman, but also as a fellow pilot, as a colleague, and the discussions we have are very frank and open that after they land and get to the hotel, they say, "I probably shouldn't have done that." But they didn't know beforehand.

DR. CHIDESTER: The research basis for that assertion goes back to work that Dr. Rosekind and Dr. Graeber did, what, 20 years ago? Can I say that, sir? Where you find that if you ask people how sleepy are you, and then you put them in a quiet, dark room in a comfortable chair or in a bed and measure their mean time to fall asleep, the question and the time are uncorrelated.

MEMBER WEENER: So, given the difficulties with the self-assessment, what procedural or other means have been put in place to address this difficulty with a self-assessment? I mean,

we've heard that we tend to overestimate our own abilities.

CAPT. SNYDER: Yeah.

MEMBER WEENER: We're not very good at judging how fatigued we are, so that then kind of begs the question, well, how do you work around this?

CAPT. SNYDER: Here's what we have done. The aircrew alertness guide provides very good -- as I mentioned before, very good best practices, latest ideas and techniques for attaining adequate rest so that you can report fit for duty. So rather than going about pointing out what fatigue is -- we define it in our FRMP, what it is -- we choose to give them tools, we choose to give our aircrews tools so that they can manage the opportunities that they do have for rest. You know, we provide sleep rooms in all of our major domiciles. We provide contractual dayrooms at locations that do not have the facilities required under our contract for our aircrews. We do many different things to help them get naps, get rest, whatever they may need during the course of their duty periods. So we just don't sling them out there.

To your point, perhaps, is we have had captains in the past call in and say, "Hey, I've got a first officer here that needs some help. He's not doing so well," and we remove him from the flight. We remove him from flight duty. So it does happen. We do have crew members talking to one another and discussing their fitness for duty, or how tired they are, or even if they're fatigued. It does happen.

MEMBER WEENER: Okay, I understand sleep rooms and the like are really mitigation techniques, not really assessment techniques.

CAPT. SNYDER: They're not.

MEMBER WEENER: I'm just curious. You mentioned tools. Do you have tools to help an individual with a self-assessment?

CAPT. SNYDER: Not that I know of. I don't know that we have any published tools to help a crew member self-assess himself for fitness for duty.

MEMBER WEENER: Okay. Thank you.

CHAIRMAN HERSMAN: Member Rosekind?

MEMBER ROSEKIND: So I have too many questions, but we're going to start with three clarifications just so I understand some of the discussion, starting with: The Fatigue Working Group specifically deals with just the debit question?

CAPT. SNYDER: The Fatigue Working Group, its primary function, contractually mandated, is to deal with those recommendations from the chief pilot office where aircrew accountability is in question.

MEMBER ROSEKIND: Okay. Next is, I think Member Sumwalt asked a key question about the 117 and elective volunteer aspect. On page 27 -- and I'm just going to credit Dr. Wilson's group, basically, for a really thorough group human performance report. And on page 27, the director of operations actually gave us at least his interpretation of the reasons that UPS did not

voluntarily, but I think the question is really right on track and I might just hone that a little, that if you could provide for the record sort of the official position that UPS has for why it hasn't volunteered, that would be very helpful for us to understand that.

CAPT. SNYDER: Yes, we will provide that for you.

MEMBER ROSEKIND: Pointed out FedEx didn't either, but we don't ask for that from you, but it would be good to get the UPS one from you as well.

CAPT. SNYDER: I have the note. It'll happen.

MEMBER ROSEKIND: Great. And I just -- this is a science thing I'll throw in, which is it's really hard to tell how fatigued you are, but there are physiological things that we use: acute sleep loss, cumulative sleep debt, been awake too long. There are physiological signs that you can do. It's translating those into checklists, et cetera, because we don't have the fatigue-alyzer that everyone would love to have. So a little longer than a minute, but let's get to some of the other questions.

One thing is, I'm curious, whether it's for the fatigue event report or the other things that your -- and I'm not getting all the acronyms of your particular ones with the other groups. But on page 21, it talked about, "UPS encouraged crew members to report any fatigue events, even if not required, by submitting a fatigue event report so that a root cause analysis can be

conducted, threats identified, and mitigation taken." So I'm wondering if either of you from the Fatigue Working Group or the other activities can actually tell us sort of the top three root causes that have been found, what threats have been identified, and specific mitigations that have taken place? And let's keep this focused and short.

CAPT. SNYDER: I'm not sure I can do that.

MEMBER ROSEKIND: Try.

CAPT. SNYDER: Bring up slide -- let's see, was that 20? 20-A, slide 3, I believe, if you would, please.

That will answer your question as to actual primary causal effects.

MEMBER ROSEKIND: Great.

CAPT. SNYDER: Just for the Airbus fleet, not overall. Would you ask me your question one more time? Sorry.

MEMBER ROSEKIND: Well, basically, you're saying that you're going to be looking at root cause --

CAPT. SNYDER: Yes, I know the one that you're asking.

MEMBER ROSEKIND: -- threats identified and mitigation, and I'm just curious, you know, can you gives us the top three of what you found in 2013 in those areas?

CAPT. SNYDER: I can.

MEMBER ROSEKIND: Great.

CAPT. SNYDER: The Fatigue Working Group looks at the operational circumstance under which the fatigue call occurs. The

Fatigue Safety Action Group dives down deeper into the actual primary causal factor. So what you're looking at there are the primary causal factors that were basically assigned to those specific fatigue calls. Everything the Fatigue Safety Action Group does is in a de-identified manner. They don't know who the crew member is. They don't know actually the -- they do know the pairing and the fleet type, but that's the extent of the identification that occurs.

One thing you mentioned, from fatigue event reports, when there is not any required, what that's referring to is that we have crew members out there that fly, are flying their lines and have not called fatigued but have said, "Hey, I would really like the Fatigue Safety Action Group to take a look at this pairing. It seems to have a pinch point." And we've had 29 of those kinds of fatigue calls this year -- fatigue event reports this year where no fatigue call was associated with it. And we treat those just like we do everything else and take a hard look at it in the same manner that I expressed.

MEMBER ROSEKIND: So, Captain Snyder, this is great. And can you maybe add to this the mitigations? And you don't have to answer now, but just for the record, subsequently, if you can highlight this and basically the mitigation strategies based on this that were actually enacted?

CAPT. SNYDER: Yes, sir, I can.

MEMBER ROSEKIND: I also think part of the questions

that were coming earlier is, you know, you highlighted shared responsibility, and, you know, some of the questions that came up -- and that's why I wanted the clarification that the working group you're talking about is just about debit or not, right?

CAPT. SNYDER: There is a secondary --

MEMBER ROSEKIND: I'm not actually interested in that group. What I'm curious about is there was a whole bunch of other groups going on, an FRMP that's happening, and in the FRMP from the FAA there's this shared responsibility that's supposed to be involved. So can you just tell us how that's enacted on your property?

CAPT. SNYDER: Sure. We provide guidance and mitigation strategies and whatnot for the crew members and we expect them to show up fit for duty. That is their responsibility. Our responsibility is to provide schedules, take mitigation steps, collect data, make changes as needed to schedules that appear to have a fatigue risk associated with them.

MEMBER ROSEKIND: Great. And so, again, it would be great for the record if you could provide us some examples of how, not on the event side but the company side, you've identified certain fatigue-related issues to schedules that have then been -- again, root cause, threats identified, and what mitigations the company chose to take. So, again, if you could kind of give us a sense of what those specific things are?

CAPT. SNYDER: Yes, sir, I can.

MEMBER ROSEKIND: Great. And we're over time, so I'll go for the next round. Thank you.

CHAIRMAN HERSMAN: Vice Chairman?

VICE CHAIRMAN HART: Thank you.

Ms. Esposito, I, frankly, was confused by your answer about the large numbers of fatigue calls from the Airbus fleet. Could you explain that? I know we were distinguishing number and rate, so I'm just asking the number, but I didn't understand what you said about the Airbus fleet.

CHAIRMAN HERSMAN: Mr. Eick, do you want to pull up 20-A? I'm sorry, Mr. Soper and Mr. Eick. That might help if you show the 2013 fatigue calls.

MS. ESPOSITO: While they're pulling up this slide, what this slide is going to show is we categorize -- we have seven different -- 1, 2, 3, 4, 5, 6 -- seven different categories regarding different fleets and domiciles that the company tracks systemwide fatigue calls. So this is for 2013.

It's one more slide up was the -- nope, the other way. One more. One more.

This is the systemwide fatigue calls, the number of fatigue calls received in 2013. If you look along the left side, that gives the fleet and the domicile. The grand total is the following one. On the A300, there were 38 out of 138 fatigue calls in 2013, which is roughly, you know, almost 30 percent.

VICE CHAIRMAN HART: And did you state a reason for

that? What was your -- that's where I was confused.

MS. ESPOSITO: Well, the next slide will show -- if you scroll down, and it's the Fatigue Call Summary -- the circumstances behind this. When the crew member fills out an event report, there are drop-down boxes and they can fill out what the cause was, and then they provide a narrative at the bottom, which is actually the most helpful piece for us. But line no change represented 16 of those 38 calls. And what that means, line no change, it means the schedule as it was constructed in the bid package. And that's where -- that was the number one reason on the Airbus for the -- the number one circumstance for the Airbus fatigue calls in 2013.

VICE CHAIRMAN HART: So I'm not sure I understand what that means, that line no change -- why would that cause more calls?

MS. ESPOSITO: The schedule as it was constructed, something in there caused the crew member to become fatigued and, for whatever reason, could not get the proper amount of rest to be rested and fit for duty for one of the duty periods somewhere in there, somewhere in that schedule.

VICE CHAIRMAN HART: Okay. Thank you.

Captain Snyder, does UPS have a near-miss reporting system?

CAPT. SNYDER: Have a what, sir?

VICE CHAIRMAN HART: A near-miss reporting system of

things that almost went wrong, where the pilots can report about them.

CAPT. SNYDER: Oh, yes.

VICE CHAIRMAN HART: My ultimate question is going to be are you satisfied that the fatigue call-in program is sufficiently robust that people are willing to do it without fear of retribution? And I'm just wondering, do you have any other indicators from -- like you've already mentioned other crew members saying, "I think this person is fatigued," or from your near-miss reporting where something went wrong and you dug into it and it looked like it was a fatigue issue. Are you satisfied from the various indicators that this program is sufficiently robust that people are willing to do it without fear of retribution?

CAPT. SNYDER: I feel that we have a very robust and multilayered fatigue program. I would hope that no crew member would feel that there's a penalty or whatever associated with calling in fatigued. We have told them that it's a non-punitive system, and every fatigue call is reviewed at its own merit. There is absolutely no reason why a crew member shouldn't call in fatigued.

As for your comment on near misses, perhaps a better corollary to that would be our ASAP reporting system. In 2013, we had a little over 1,000 ASAP reports. In that ASAP report there is a little box that can be checked that says fatigue. Of those 1,080 or so ASAP reports, there were about 113 or so where those

boxes were checked, so 13 percent, something like that. So, yes, I feel very confident with our fatigue system the way it is set up.

VICE CHAIRMAN HART: Okay. Thank you.

And, Ms. Esposito, I'm not going to put you on the spot about your views, but have you heard from your fellow pilots how they feel about whether they can comfortably report without fear of retribution?

MS. ESPOSITO: With all due respect to Captain Snyder, we have come a long way from where we started in our working with the Fatigue Working Group; however, if you were to ask me, and I am confident if you would ask most line crew members if they feel we have -- we're stakeholders and have buy-in to this program, in the fatigue program very much as we do with our, say, no fault go-around program, I don't think we're there yet. I think we've started. We're in our infancy. We have some work to go.

The crew members know that if you call in sick a certain amount of time -- I think it's 6 sick calls in 13 months -- you'll get a call from your assistant chief pilot, and that makes pilots nervous. Pilots have a certain type of a personality. They want to do a good job. They're Type A personalities. Some people just don't want to draw attention to themselves. So I've been told by friends that, "I've called in sick instead of calling in fatigued," and whatnot. I think we're on the right track, but I don't think we have complete buy-in from the pilot group. I don't

feel that we feel like we're 100 percent stakeholders, being involved more in root cause analysis.

And we recognize we have some issues and some problems, and we end up at the Fatigue Working Group level no-debitting some of these fatigue calls that were initially recommended for debit, but we need to go back and correct what was wrong in the first place. We need to do it collectively, and we need to do it to get complete buy-in from the crew members.

VICE CHAIRMAN HART: Okay. Thank you.

CHAIRMAN HERSMAN: We've had a little bit of discussion about the new fatigue rules and I just want to make clear we've gotten a number of different pieces of information, all of them have some aspect of analysis associated with them. We're trying to understand how to deal with them. One of them we received today, and so -- and the other parties hadn't had a chance to review it. Our team is committed to working with the parties to establish factual information and will continue to do that throughout the investigation. But we just need to be cautious, as we're moving into areas where we might hit analysis, and so I just want to put that out there.

I do want to focus a little bit at a higher level. I think we've been really in the weeds on a lot of different things. And so maybe I can come to Dr. Chidester and just ask you in general about what are some of the high, you know, the high-frequency risk factors that you see that affect human performance?

So just kind of the bucket list.

DR. CHIDESTER: The bucket list? Well, I guess I would go to some of the things that have shown up in the ASAP programs and the things that have shown up in FOQA programs. I would go to those lists and take a look at those. Non-precision approaches would certainly be there. We have a history on that. Communication, both within the cockpit and external to the cockpit; missed communications between pilots and ATCs is a large one. Runway safety is another issue that's there.

I'm sorry, I didn't bring along a list of things, but I guess in general what I would say is take a threat and error management approach to each flight. As you look at the flight, what's present, what's likely to cause a problem for that, and what should we prepare for, for that particular approach -- for that particular flight.

CHAIRMAN HERSMAN: Okay. So you're talking about all, kind of all flights, all flight operations: passenger, cargo, day, night. You know, you're looking at it more in an aggregate, correct?

DR. CHIDESTER: Correct.

CHAIRMAN HERSMAN: Okay. Do you see any differences between passenger flights and cargo flights as far as risk, or are they the same?

DR. CHIDESTER: There are things that are different. You're unlikely to have a passenger cause you a problem on a cargo

flight, although it can happen with a jumpseater. You're more likely to have a cargo problem. I mean, we've seen histories of those events. The nighttime operation versus the daytime operation -- I mean, these cargo operations are done predominantly at night and passenger operations are done less frequently at night, although there are overnight flights. But for the task of the pilot, I'm not sure there's that great of a difference in the exposures to risks between those two different types of operations.

CHAIRMAN HERSMAN: Okay. So nighttime operations, are there particular risk factors that are either unique or elevated for nighttime operations?

DR. CHIDESTER: Anything that's unobservable outside of the cockpit is elevated in a nighttime operation. Any unlit terrain, for example, is an issue in that black hole approaches only show up at night, are only an issue at night.

CHAIRMAN HERSMAN: Does the research show that there are more fatigue issues at night, in night operations?

DR. CHIDESTER: Oh, yeah, certainly. Human fatigue is kind of predictable by time of day, time on duty, and time since awakening, and combine that with any sleep debt that you've got. Night operations potentiate that.

CHAIRMAN HERSMAN: Okay. Thanks. That was great. I was just looking for kind of a more broad overview of what we're looking at as far as risk.

Let me go to Captain Snyder and ask you, I think you had mentioned a number. I just wanted to make sure that I had written it down correctly. I think you said 120,000 flights a year? Was that about right?

CAPT. SNYDER: Yes, ma'am, that's correct.

CHAIRMAN HERSMAN: Okay. What percentage of those flights are taking place during kind of what we would call nighttime hours? And I don't know, maybe you can tell me how you would define nighttime hours, because it's probably different for different people.

CAPT. SNYDER: I would say the majority of our flights occur at night. We do have day flying. You know, let's say up to 2000, we'll call that -- up to 8:00 in the evening, we'll call that day flying. We do have flights that operate in daylight. The majority of our flights occur from 8:00 at night till 6:00 or 7:00 in the morning. That's the nature of the business.

CHAIRMAN HERSMAN: Can you ballpark it? When you say majority, are you talking about 55 percent, or are you talking about 95 percent?

CAPT. SNYDER: It's higher than 55, but it's not 95. So, you know, 75. I don't know.

CHAIRMAN HERSMAN: Sure.

CAPT. SNYDER: It's a significant number of our flights.

CHAIRMAN HERSMAN: I think if you could maybe provide that, that would be of interest, just a data point for us.

CAPT. SNYDER: Okay. I will do that.

CHAIRMAN HERSMAN: Great. Why do they occur at night? So maybe just kind of help us understand that. Can they not occur during the daytime? Are there, you know, activities that need to take place? Is it because of congestion at the airports you're serving? So help us understand why these flights take place at night.

CAPT. SNYDER: You're asking me to speak for the company now, you understand that?

CHAIRMAN HERSMAN: Well, you are representing the company on this panel, sir. But if you want to --

CAPT. SNYDER: We have a business that guarantees --

CHAIRMAN HERSMAN: If you want to get back to us if you don't feel comfortable answering, I think it's more just to give people a high level of understanding of why are all the cargo flights predominantly taking place at night. I know you have a sort process and all of that, but maybe just help us understand the reasons why they occur at night?

CAPT. SNYDER: We have a business that guarantees delivery by between 8:00 and 10:00 in the morning, and in order to do that we have to fly at night. That's the business model.

CHAIRMAN HERSMAN: Does it have anything to do with congestion at airports or in the air or anything like that, or it's really just because it's an overnight delivery service?

CAPT. SNYDER: It's an overnight delivery service. But

there are some benefits to flying at night, and congestion, chatter, weather, those are actually less of a threat in a normal night of flying because it's not out there.

CHAIRMAN HERSMAN: Okay, great. Thanks.

Member Sumwalt?

MEMBER SUMWALT: Thank you.

Captain Snyder, a moment ago when I was asking you about a crew member being able to attest for future legs and you said, well, we assume -- something along the order of we assume that they will manage their personal time responsibly. But would you acknowledge that -- yes, that is certainly one factor there, the crew members do need to manage their personal time in a responsible manner, but would you acknowledge that there are other factors that could contribute to fatigue as well, other than managing your personal time?

CAPT. SNYDER: Sure. I mean, life continues. I mean, we have gotten -- and sometimes they're humorous, but we get fatigue calls from crew members that have had a biological issue with a child in the middle of the night. We get fatigue calls from crew members that perhaps got a brand-new phone and didn't know how to turn it off. I mean, there's -- I wish I could tell you that I've seen it all, but I haven't even come close to seeing it all.

MEMBER SUMWALT: I understand. Thank you.

Captain Parker, you were talking about monitoring and

you said that you're, quote/unquote, talking about monitoring this year, and I think you mentioned that -- or since the accident, I think you said there's been talking about monitoring. I believe you said you're going to make it an emphasis item for 2014, I believe. So tell me specifically what you're doing. I think you gave some generalities. I want some granularity for how do you train monitoring. And I think Dr. Chidester mentioned a few of them, but I want to hear how UPS is planning -- how they've done it prior to the accident, and how you're planning on doing it moving forward.

CAPT. PARKER: Well, I think when you look at active monitoring, I think -- I kind of break it down in three parts. I look at visualize, act and compare, and that's kind of what we teach, we've taught in the past. And as far as 2015, is part where we're going to implement that. We're right now developing those 2015 pilot-monitoring modules. But it's mainly to make sure that the pilot can confirm and verify and be there for -- that anything that back up our standard operating procedures. It's mandatory. It's in our FOM, and we talk about the importance of active monitoring. And we also -- the handout that I showed you earlier that we have, it also talks about monitoring there too.

MEMBER SUMWALT: I've been thinking about monitoring for a pretty good while now, and what I'm finding is that you can talk about it a lot and you can read about it a lot, but that doesn't necessarily transfer to the line operation. So I'm trying to

figure out how to make that transference to the line operation. I think you said that you look for it on line checks. I believe you said that. How do you evaluate it and -- what are you looking for when you evaluate it; what are the forms you use to document, that you are evaluating it on? So those are the questions there.

CAPT. PARKER: Well, I think when you talk about active monitoring, you're talking about the standard operating procedures, which is also mandatory. And that is, whatever we do as far as the standard operating procedures -- callouts, checklists, stabilized approach criteria, any of those things, we expect our crew members to -- or the pilot monitoring to be in the loop and identify when something like that is not happening. It is something that I think we're -- and I forgot the second part of your question.

MEMBER SUMWALT: It's the data part of it. Do you have a form --

CAPT. PARKER: Yes.

MEMBER SUMWALT: -- a line check form, or a simulator check form, or LOFT, or whatever, where you specifically are checking off that you evaluated whether or not the monitoring was adequate?

CAPT. PARKER: Yes, sir, we do. If we look at our line check forms, and I'm not sure if we have any of that. I can furnish that for you. We also do it in our training. In our normal training grade sheets, we do look at pilot monitoring.

MEMBER SUMWALT: So that is something that would be in crew records, would be how well people are monitoring? You're keeping records of that?

CAPT. PARKER: Yeah, and if you -- you know, we expect -- well, our pilots are trained to a qual standard, and that's one of the things that we would check off. If there is someone that is deficient in that area, let's say, then we would remediate that person, indicate that in our forms. Hopefully, we can remediate them in that footprint. If it's necessary to give them additional training in this area of pilot monitoring, we can do that, and that is also part of the record.

MEMBER SUMWALT: Okay. Thank you very much.

CAPT. PARKER: You're welcome.

CHAIRMAN HERSMAN: Member Weener?

MEMBER WEENER: Yes. Captain Snyder, you seem to have the dubious distinction of being the UPS spokesperson. I have some questions about -- I've heard a lot of acronyms, Fatigue Risk Management, CRM, ASAP, LOFT, FOQA, and so forth. Are these all separate kind of programs or do they fit under some larger context?

CAPT. SNYDER: They all fit under a safety umbrella that's -- I mean, the whole, the entire gamut of the acronyms that you use provide data that help us train our aircrews, improve our systems, give us better ways of doing things. Yeah, to answer your questions, we do use all that --

MEMBER WEENER: Okay, what I'm fishing for is a safety management system, an SMS.

CAPT. SNYDER: Yes.

MEMBER WEENER: I'm just curious how well matured an SMS is at UPS.

CAPT. SNYDER: We're in the stages right now of implementing SMS. It is being talked about. It is being enacted. We're working through the growing pains of doing it as we speak.

MEMBER WEENER: How long has that process being going on?

CAPT. SNYDER: Two years.

MEMBER WEENER: Two years. Thank you.

CHAIRMAN HERSMAN: Member Rosekind?

MEMBER ROSEKIND: So, Captain Snyder and First Officer Esposito, if I could just ask the two of you to provide a couple things. One is I'd like from both of you sort of your perception of how shared responsibility related to fatigue is enacted at UPS, so whatever sort of the company official position is, IPA, specific efforts and activities that represent shared responsibility on the property.

The second thing is there's been a lot of discussion and the NTSB is very strong on non-punitive reporting systems, not just about fatigue but across the board. And so it's clear the two of you have different views and perspectives of this, so I'm curious if you can just help us understand if there have been any

efforts at all to get beyond just sort of individual views of this, any surveys, any other data collection, anything at all that gives you a sense of how people view the reporting system, whether they use it or not. There was a drop, 2011, 250 reports, down to the 138. How do you interpret that without having some sense of whether people think that's a lot or too little? So whatever you can tell us about people's attitudes, perceptions about that would be great.

And I've just got to make a general comment, which is that sometimes the questions really aren't tricky. I'm thinking, you know, when the Chairman says, "Why do you work at night," it really was just your business models, during the day -- you know, Dr. Chidester is like, just these things. Everybody is trying to understand the other level. Sometimes it's straightforward.

So, I take it the two of you have actually sat in on the fatigue education, that hour and a half? I'm not checking the rolls; I just want to make sure --

CAPT. SNYDER: Yes.

MEMBER ROSEKIND: You've been there?

CAPT. SNYDER: Yes, sir.

MEMBER ROSEKIND: Okay. So how is the knowledge acquisition actually evaluated? How do you know people are getting the information? Is there a test? You know, what do you collect to make sure people actually had their eyes open, paying attention, and were learning what you wanted them to?

CAPT. SNYDER: Yeah, that's a good question. There were a few years when we -- the last few years that we taught flight crew factors, there was actually -- as we brought crew members in, we actually gave them a little quiz to see where their knowledge base was. We did that with basic indoc, also. I don't know if we still do that practice or not. I'm not involved in our CRM teaching programs anymore, but at one time we did do that.

MEMBER ROSEKIND: Great.

CAPT. SNYDER: And then we would give them a little quiz at the end to see if they retained what we talked about.

MEMBER ROSEKIND: And it would be very helpful, any data you could put together on that initial versus recurrent, for example, just to give a sense of what are people really learning; if it's the second time around, are they getting better, worse, that kind of stuff.

So my next question actually is, is there any attempt to understand whether they enact that information, do they apply it?

MS. ESPOSITO: I would say regarding the recurrent model in terms of the fatigue education -- and there was a gap, as Jon mentioned -- it rotates from home study to classroom. This year it was home study. I wouldn't categorize it as a very robust model in terms of what was taught. It contained, I believe, just excerpts from the fitness for duty fitness guide. I think we can do better. There were maybe one or two questions on the test, but they were very basic questions. So moving forward, as I mentioned

before, we've come a long way, but we still have a long way to go, not only in fitness education, understanding, but it's a cultural issue. It's a cultural issue with the corporation because they have a business to run. They try to do like many businesses, they try to do more with less, which means more productivity. There's a culture --

MEMBER ROSEKIND: Okay, I'm going to have you go right there because I'm actually going to pile this on a little more for both of you, which is I think you used a good word, and that is -- any information you have about the robustness of that program, it would be great to have you provide that to us. So, you know, not just how many people went through, but how much did they really learn. Do you have any ways of evaluating they're actually using that?

It's great to talk about professionalism, but we've had people in here with distraction issues that had the policy, had the course, showed us the training score of that individual, and then they were on the phone when they shouldn't have been in an operational setting. So, you know, what can you show us where we've got the course, it's robust, but it actually ends up changing behavior or doing something that matters in some way.

So, here's my last piece, which is just to put the two of you on the spot before we get to Dr. Chidester. And you've got this in there where it's very clear: "It cannot be overstated that sleep or lack of sleep greatly affects our level of

performance." Between the two of you, just give us a short list -- lose sleep, disrupt the clock, what are some of those performance decrements that people might expect? Short list, because then we're going to let Dr. Chidester pull it together.

MS. ESPOSITO: We each get a list?

MEMBER ROSEKIND: Whatever -- just short, a couple of them.

CAPT. SNYDER: From lack of sleep?

MEMBER ROSEKIND: Yep, or Circadian disruption.

CAPT. SNYDER: Sure. SA, being able to do "what if" planning, making proper decisions, communicating properly, all the CRM topics that we teach and discuss.

MS. ESPOSITO: Poor risk assessment, poor coordination with complex maneuvers or tasks, delayed response and reaction, and so forth.

MEMBER ROSEKIND: So you're high-order people. That wasn't even what I was looking for. It's sort of like we're talking vigilance goes down, right?

MS. ESPOSITO: Vigilance goes down.

MEMBER ROSEKIND: Reaction time goes down, being able to pay attention goes down. And that's why I wanted to give Dr. Chidester the closing, which is, when those basic fundamental sort of human capabilities are degraded, how is that going to affect monitoring, communication, situational awareness? I'm going to let you close it.

DR. CHIDESTER: Well, I think they've made a good list of what the issues are at a relatively low level. The consequences are exactly what you said, the other things: the situational awareness is threatened; the ability to perform a procedure in a timely manner and appropriate manner is threatened. The willingness to accept a lower standard of performance in yourself begins to show up when you see people who are significantly fatigued.

MEMBER ROSEKIND: And so, just take one of those monitoring. What is the kind of thing that you would see, a fatigue effect in monitoring?

DR. CHIDESTER: You'd see things missed; something that I do that you don't catch, something that I forgot to do that you don't catch and correct. All of those monitoring things in both myself and the person who's watching me are at risk.

MEMBER ROSEKIND: Great. Thank you.

CHAIRMAN HERSMAN: Vice Chairman?

VICE CHAIRMAN HART: Thank you.

We've heard a lot of talk about standard operating procedures and how important they are, they're mandatory, and et cetera, et cetera, and I think we all would agree that standard operating procedures are very important, but we know that in complex systems sometimes they don't quite work. So maybe they don't quite do what they're supposed to or sometimes they produce unintended consequences that weren't foreseen when the procedure

was generated, et cetera, et cetera.

So my question -- I'm not sure whether this should be addressed to Captain Parker or Captain Snyder, so I'll just say it's a UPS question and let you guys work it out. And that is, is there -- do you have a feedback process of any kind that enables you to hear from the frontline workers, i.e., the pilots, the dispatchers, whatever the issue might be, the maintenance people, whatever it is, that lets you know that the standard operating procedure that maybe you're seeing lots of noncompliance with and are not sure why, except you know it's not because you have bad people who don't like to follow rules, but maybe that means it's because the standard operating procedure doesn't quite fit the circumstance, and I'm just wondering, do you have feedback processes that would help you identify and remediate some of those standard operating procedures?

CAPT. PARKER: Yes, sir. We have several ways that we can get feedback from our crew members if some standard operating procedure is not adhered to. And one way is our pilot reports we call our event reports. They can come in and do it that way. We also have an open-door policy within our company that if anyone wants to come to us and talk to us about standard operating procedures or if there was a breakdown in one of our crew members, they could come in and talk to us that way. The other one is our ASAP program, and we talked about ASAP before. So a lot of times we use that. It is a confidential process, as you know, but they

can come and identify breakdowns in standard operating procedures.

Probably the second part of that, if there's any deficiencies relating to standard operating procedures, we have to address it. If there was a continuing problem with a crew member and someone told us about it, we have to address it.

There was one other avenue that I missed that they can use. The Independent Pilots Association has a Professional Standards Committee that they can also go to and talk about maybe deficiencies in standard operating procedures.

VICE CHAIRMAN HART: Captain Snyder, do you have anything to add to that?

CAPT. SNYDER: I think he pretty much covered the list. We also, you know, have a voluntary disclosure program that we work with the FAA. I mean, we have hazard reporting that's available to our crew members, to our mechanics, to anybody on the property. There's myriad ways that we can get feedback from crew members on things that they're -- actually, from any employee, just not crew members, of things they're concerned about.

VICE CHAIRMAN HART: Okay. Well, thank you for that high-level answer. Now I'm going to get more specific about one standard operating procedure that we talked about in the last panel, and that is, of course, the profile approach. And I'm just wondering has there ever been feedback regarding the way the profile approach processes work that have resulted in changes to -- you know, because we see that it's complicated, we see that

it's not used very often, so there are some inherent sort of threats, if you will, talking about threats in error management. Has that process ever seen any -- benefited from any of these feedback loops that you have that help you fix standard operating procedures to make them more usable in the real world?

CAPT. PARKER: No, I haven't, I haven't heard of -- and it doesn't mean that we've had some concerns as far as profile approach is concerned. You know, we have a very good, robust training program in training profile approaches. They come in and they have an opportunity to see that when they come back to recurrent training. I have not noticed. I'm not saying that there's not. There might be some concerns, but not to the detail where we feel that there is a big issue there with profile approaches.

VICE CHAIRMAN HART: Captain Snyder, anything to add on that?

CAPT. SNYDER: You know, this morning, in Panel 1, both Captains Middleton and Laurentz were discussing -- I can't remember which one of the Board Members asked them about non-precision approaches and their difficulty levels, and I don't know if it was articulated that we're not building -- the U.S. isn't building any more precision approaches. We're proliferating with non-precision approaches, our RNAV approaches, which both Captain Laurentz and Captain Middleton alluded to are just as safe, if not as easy to fly as a precision approach. Easy being a, you know, a

term that I'm just throwing out there. All approaches are challenging, have their challenges. But that is the reason, because of the myriad type of approaches, that is the reason that we have those non-precision briefing guides in our AOMs and in our QRHs, so that we have that available to us to ensure that we don't make mistakes when we're shooting those approaches.

VICE CHAIRMAN HART: Okay. Thank you very much.

CHAIRMAN HERSMAN: Dr. Chidester, in the scheme of things when we talk about the different risk profiles for different types of flights, going back to that high-level look, in the scheme of things, when we're looking at 120,000 flights but only 138 calls on fatigue, is that in line? Is there anything that we have as far as other industry comparisons to understand if that is appropriate?

DR. CHIDESTER: I don't know. I don't know what data we would look to, to answer that question, to figure out if that's a high rate, a low rate, or a moderate rate. I really don't know.

CHAIRMAN HERSMAN: How many sick calls -- maybe, on the UPS side, do we have kind of a sense of how many sick calls you might get annually?

CAPT. SNYDER: No, ma'am, I don't have a clue as to how many sick calls we -- it's certainly more than 138.

CHAIRMAN HERSMAN: Yeah. Yeah, well, we definitely -- we could see some of that in the factual record with respect to sick calls just for these two crew members. I'm wondering if

people are using sick calls as fatigue calls and if there's a different treatment. Do you get more scrutiny for a fatigue call or do you get more scrutiny for a sick call? So help me understand that.

CAPT. SNYDER: From a crew member's perspective, a sick call is going to immediately affect his sick leave account. From a fatigue call perspective, as you can see from the data that we provided you, over two-thirds of the time his sick leave account is not affected. So, in reality, if a crew member really is fatigued, throw the fatigue card. Pull yourself. You got a -- you know, it's non-punitive. We're going to examine it for you.

CHAIRMAN HERSMAN: But sick leave, I mean, you have sick leave, right? That's non-punitive, too. If you have sick leave, you can use it.

CAPT. SNYDER: No, sick leave is not punitive. Is that what you're saying?

CHAIRMAN HERSMAN: Right.

CAPT. SNYDER: Did I understand you correctly?

CHAIRMAN HERSMAN: I think if somebody doesn't feel well, they could take a sick day, right?

CAPT. SNYDER: Absolutely. Absolutely.

CHAIRMAN HERSMAN: I mean, they earn that. They can take it.

CAPT. SNYDER: Absolutely.

CHAIRMAN HERSMAN: So do you think, though, some of the

fatigue calls are coming in as sick calls?

CAPT. SNYDER: I don't have insight into that. First Officer Esposito may have insight into that from discussing that with crew members.

CHAIRMAN HERSMAN: Okay. Please.

MS. ESPOSITO: I would agree with you, Madam Chairwoman. I would agree that crew members call in sick at times when they should be calling in fatigued. I had dinner a couple weeks ago with a friend of mine who told me the exact thing. I said, "I never got your event report." He said, "I was so tired I didn't go to work." And I said, "I didn't get your event report," and he said, "Oh, I just called in sick." And the reason why -- as Jon brings up, that if the fatigue call is reviewed and we find that the crew member should not be debited sick, he's in a better position financially than if he called in sick, but it's the point I was trying to make earlier, that crew members don't have full buy-in to the fatigue program. They feel like they're highlighting themselves in some way.

Again, it's a cultural thing. It's a pilot personality issue in terms of maybe it's perceived as a weakness. This pairing was built this way, this trip was built this way; I should be able to fly it. The other crew flew it; why can't I fly it? That type of reasoning. But I do agree with you and I know for a fact people tell me that they call in sick when they probably should have called in fatigued.

CHAIRMAN HERSMAN: So the challenge there is you're not getting the data, you're not getting the information, you're not getting more feedback on what needs to be changed or what needs to be addressed. If they're calling in sick, it's masking some of -- potentially masking some of the fatigue issues so you're not getting full feedback or full information for an SMS?

MS. ESPOSITO: That's our belief. From the IPA standpoint, that's our belief. And we have tried with the Fatigue Working Group to keep this event report system, to keep it in a very limited distribution versus going out to a lot of people within the company to review it. We've tried to keep a very limited distribution because we want people to be forthcoming and honest and explain why they are fatigued. But again, they're admitting when they fill out a fatigue event report that they weren't 100 percent, and that's challenging for a pilot to come forth and do that. So I think we need to work together to get more buy-in from the pilot group on this and work towards an understanding that it is a no-fault, non-punitive program.

CHAIRMAN HERSMAN: Right. So, but you've got 10 percent of your ASAP reports have a fatigue component, so you're getting more data through there. I think my question would be at the end is, how do you get better buy-in to some of this, and also, how do you create an environment that is more of a partnership?

I've seen some really outstanding successes in the aviation industry, whether it's through operations like CAST or

ASIAS or others, where you really do have all of the stakeholders represented. And I've seen some really exciting things within UPS, some of the work after UPS 6 that was done with respect to dealing with smoke and fire and other things. Again, those were very good joint, I think, accomplishments.

And so maybe trying to understand, if the FRMP is so important that it's included in annual training for all pilots, is there a role there? Is there a way to create better buy-in and more trust to get better reporting and more accountability in all of it? I think that's what I'm struggling with here. Because it's definitely a problem that both sides are dealing with, and when you talk about the shared responsibility -- it's a shared responsibility on the front end because, gosh, you guys are all here on the back end of it, and it's a very painful shared responsibility now.

But I see some of -- I mean, I was at UPS back in 2006, and I saw the facility that you all have, the availability of rest and sleep rooms. And you know what? We're looking through this crew's history, this flight crew that we're looking at, and they took advantage of those sleep rooms. That's part of that shared responsibility. Make that available to them, and they have the opportunity to take advantage of it.

And so, I guess I'm just struggling with there seems to be a lot of tension and frustration with respect to these issues. I don't understand it because I've seen some great wins. So help

me understand why we're in this situation where it seems to be frustrating. And I could hear the frustration in your voice, Mr. Snyder, and we don't -- you know, I know that's difficult.

CAPT. SNYDER: Yeah, I can say in a very positive way that the things that you are talking about are being discussed. So it's, you know, not a slam-door approach to anything. And I can tell you that at the Fatigue Working Group, that we work very well together and that we share our information openly and discuss topics. And I can tell you that at a Fatigue Safety Action Group level that, you know, every concern that an aircrew member has is looked at, because right now the company assumes the responsibility from a safety perspective to making sure that those schedules are okay.

CHAIRMAN HERSMAN: I know we have a follow-up question from the Tech Panel, so I do want to go back to them. Anyone else have anything?

(No response.)

CHAIRMAN HERSMAN: Okay. Dr. Wilson?

DR. WILSON: Thank you.

We've talked a lot about pilot monitoring, and I want to go back to close the loop on the training that's going to be required of operators. You mentioned that -- Mr. Burke, that pilot monitoring training is going to be required as a part of LOFT scenarios. Can you go into a little bit more explanation as to what specifically is required in those LOFT scenarios?

MR. BURKE: Sure. So currently we have pretty robust guidance in the SOPs advisory circular, as has been pointed out, CRM advisory circular, and the LOFT advisory circular. We will be, however, developing further training as this rule is required. It's a 5-year compliance period, and we have a -- as the administrator has announced, we started an air carrier steering group, where we're going to work with industry and develop the best practices, the best methods to train pilot monitoring, which, you know, right now it's basically mode awareness, callouts, adherence to SOPs. I believe we can probably do more with that and teach pilots how better to monitor and the catch-falls to what to look out for.

DR. WILSON: And when the 5-year period is up when operators need to have this implemented, what will the FAA do to ensure that the operators are meeting these -- implementing these best practices?

MR. BURKE: Sure. So, we will develop guidance for that training. Right now, we're looking into a project where we can combine the SOP and CRM advisory material into one cohesive document, so where the CRM and the SOPs can support pilot monitoring, so they're not three separate components. And in the development of that guidance material will be that training. Once that training is out there and available to the operators, the local field offices will help them, help each air carrier implement that training and make sure it meets the expectations of

both the rule and the advisory circular.

DR. WILSON: And are you aware of any operators out there that are currently implementing pilot monitoring training, something to use as a model for other carriers?

MR. BURKE: Sure. Yeah, and, you know, that's how some of our best rules come about, is emulating our best operators out there. So I don't have an exhaustive list now, but working with the industry, I know there's some very good programs out there.

DR. WILSON: Thank you. That's all the questions I had.

CHAIRMAN HERSMAN: Do the parties have any requests for any follow-up?

(No response.)

CHAIRMAN HERSMAN: I know you all want a break, and we're going to take one. We're going to go back to Member Rosekind for one last question.

MEMBER ROSEKIND: Actually, I'll just comment that I believe the two times NASA ASRS database has been examined, 21 percent of their reports have some fatigue element to them. So as a base rate, there's a place to start.

Captain Snyder, First Officer Esposito, it would be great if you would just submit this to the record, and all I'd ask is if you want to give us just one sentence. What's next for fatigue management at UPS? What do you think you're doing great that really needs to be enhanced, and where are the gaps that need to be addressed to really get you where you need to be to

effectively manage fatigue? If you have one sentence now, that would be great. If not, again, follow up to the record. Whatever you'd like.

MS. ESPOSITO: We can do both.

MEMBER ROSEKIND: Whatever you'd like. Keeping it short.

MS. ESPOSITO: Just keeping it short, I think in order to be successful like our very successful ASAP program at UPS that's highly successful, we need all stakeholders involved and we need to be able to have buy-in from our crew members. We heard about the sleep rooms that we have in Louisville as a great fatigue mitigation tool. We need them not only in Louisville, we need them at every sort facility for fatigue mitigation where we sit during the sort, and we need to educate the crew members to be using those sleep rooms and mitigation tools.

CAPT. SNYDER: There's always room for improvement in education, whether it be more robust in a classroom setting, whether it be more robust in a home study, as you alluded to. We will continue to work with our aircrew to make sure they understand our programs, especially as it pertains to fatigue. We do want their reports. You know, UPS does not want our crew members flying in a fatigued state. If they're not fit for duty, we do not want them operating an aircraft. We do treat each fatigue call as a separate safety incident. We do investigate it thoroughly. I do enjoy working with my counterpart in the Fatigue

Working Group. We've made it work very well over the last 2½ years, and I would like to see that collaborative approach continue.

MEMBER ROSEKIND: Great. Thanks.

CHAIRMAN HERSMAN: Thank you all for your patience. We're going to take a short break. We will reconvene at 3:15.

(Off the record at 2:57 p.m.)

(On the record at 3:15 p.m.)

CHAIRMAN HERSMAN: Welcome back. I see the crowd is thinning out, but thank you to all of you who are sticking with us. We will be wrapping up our hearing with this last panel.

Mr. Lovell, will you please introduce the third panel witnesses and swear them in?

MR. LOVELL: Thank you, Madam Chairman. Witness Panel 3 is composed of the following individuals: From my left, nearest to the Board, Mr. John Heinlein, Mr. Jeff Chestnut, Mr. Gordon Rother, Mr. Matthew Amesbury.

The Technical Panel is composed of, starting from my right, Mr. Romain Bevillard; Dr. Dan Bower; Dr. Katherine Wilson; Captain David Lawrence, panel lead; and Ms. Dana Schulze.

I now ask that the witnesses please stand to be sworn.

(Witnesses sworn.)

MR. LOVELL: Chairman Hersman, these witnesses have been prequalified and their respective experience and qualifications appear in the docket as exhibits in Group 1. I now turn

questioning over to Captain Lawrence.

CAPT. LAWRENCE: Thank you, Mr. Lovell.

Good afternoon, Panel. Beginning with Mr. Heinlein on my left here, if you'll just go down the row and give me your name, your title, and affiliation, please?

MR. HEINLEIN: John Heinlein, FAA inspector over dispatch.

MR. CHESTNUT: Jeff Chestnut with UPS, flight training and safety manager.

MR. ROTHER: Gordy Rother, FAA Headquarters, dispatch inspector.

MR. AMESBURY: Matt Amesbury, dispatch trainer, TWU.

CAPT. LAWRENCE: Thank you, gentlemen.

Mr. Rother, I'd like to start with you just so we can get an overview of the topic that we're going to be talking about for the next time period for this hearing. Can you just tell me what the role of a dispatcher is in the operation of, like, a 121 operator?

MR. ROTHER: Sure. Aircraft dispatcher is a certificated airman under 14 C.F.R. Part 65. 121 domestic and flag require the operator to employ aircraft dispatchers to exercise operational control jointly with the pilot in command.

CAPT. LAWRENCE: Would you say that the dispatchers have access to the most current weather and airport information?

MR. ROTHER: Responsibility for operational control

rests with the carrier. It's the carrier's responsibility to ensure that the dispatchers and pilot have the most current information for your planning and conduct of the flight operations.

CAPT. LAWRENCE: Well, you anticipated my next question. Let me talk about the responsibility you just mentioned. Under 121.533 and .535, the regulations that are commonly referred to as joint responsibility, can you talk to me about joint responsibility for the dispatcher, that 50-percent responsibility, and what does that mean to the FAA?

MR. ROTHER: Sure. Basically, the 50-percent responsibility is the dispatcher, under 121, has the responsibility jointly with the pilot in command for the preflight planning of the operation, the delay of the operation, and the construction of the dispatch release, the required elements of the dispatch release. And so that -- basically, they are jointly responsible to take all aspects of the operation and formulate the dispatch release, which sets forth the conditions the operation is to be conducted under.

CAPT. LAWRENCE: Thank you. You told me when the responsibility begins. When does it end? Does it end when the pilot signs the dispatch release?

MR. ROTHER: No, the dispatcher has a responsibility, once the aircraft is airborne -- or, actually, continues the responsibility to monitor the progress of the flight. Under

121.533 he's responsible to issue information, any information that may affect the safety of the flight, and he has a responsibility to cancel or re-dispatch jointly with the pilot in command. 601 requires the dispatcher to provide the pilot in command any available weather information necessary for safety of operations.

CAPT. LAWRENCE: Thank you. We'll get into the 601 in a little bit as far as the weather dissemination. But I do want to ask, does the FAA require that dispatchers give verbal briefings to the pilots prior to every flight?

MR. ROTHER: Our guidance talks about the requirement to conduct a briefing. The briefing can be either verbally or in written form. Really, it's the air carrier's responsibility to determine when verbal briefings would be required. We don't specifically lay out any provisions of when a verbal briefing would be required versus a written briefing.

CAPT. LAWRENCE: Okay. We'll narrow it down to -- Mr. Heinlein, if you could tell me if UPS itself requires their pilots to verbally brief as a company policy?

MR. HEINLEIN: There is no obligation for a verbal that I know of. It's just under the umbrella of constantly updating. It can be via many means. The original is on the release. Updates thereafter would be in the form of ACARS messages, radio contacts, but there's nothing delineating the difference between a verbal or written.

CAPT. LAWRENCE: Thank you.

Mr. Rother, if you could tell me, in the case that a dispatcher would want to talk to a pilot for some reason, give me some examples of what a dispatcher would consider important enough to want to talk to a pilot.

MR. ROTHER: Well, in our guidance, we do have a couple of examples. An example would be an operation with marginal weather, an operation that an aircraft has an inoperative component that may be restrictive: shortened runway, those types of things, contaminated runways.

CAPT. LAWRENCE: Thank you.

Mr. Amesbury, can you discuss the various methods of communications that UPS trains their dispatchers to use to contact pilots?

MR. AMESBURY: Yes. Our primary method is the briefing package, which is prepared with the flight release and flight plan. That provides the crew with all of the latest weather and NOTAMs at the time of the print, and any company information, airport information. We also have our ACARS system, our communications system with the airplanes we use. We have VHF/HF radio. We have sat comm links on most of our airplanes. So we have multiple means of communicating with the crew.

CAPT. LAWRENCE: Okay, Mr. Soper, if you can start pulling up 2-Alpha, page 27.

And, Mr. Amesbury, let me stay with you. What is

dispatcher resource management?

MR. AMESBURY: Dispatch resource management is the use of -- it's improving communications amongst all the groups of the airline to operate a flight safely. We're in contact with all of the various departments in our operation, maintenance, contingency, crew scheduling. We have subject matter experts for the fleets that we use. That's the primary resource management that we do. We do it every day. Whenever we have issues, we will confer with those departments and maybe even get them on the phone with the crew members to solve problems.

CAPT. LAWRENCE: So I may have missed the users you were talking about. Were the pilots included in that whole process as part of the users that DRM is reaching out to?

MR. AMESBURY: You mean as far as -- yes, we do use the crew members, too, for DRM, yes.

CAPT. LAWRENCE: On the overhead here is an excerpt from the Flight Operations Training Manual, and I understand that training for dispatchers is referenced in the FOTM, is that correct?

MR. AMESBURY: The requirements are, yes.

CAPT. LAWRENCE: Right. The very last bullet there, number (b) there says "Better interface" -- and these are the objectives of DRM as defined in the UPS manuals, and it says, "Better interface with each PIC, consistent with the joint responsibility concept outlined in part 121." My question is,

what does better interface with the PIC mean to you?

MR. AMESBURY: Better interface with the PIC, well, it means contact with the PIC. Generally, we teach remarks -- we use the remarks of the flight release to give them additional information that doesn't come with the briefing package. And if we cannot cover information that way, we will call. We can contact them on the phone. That's the interface, or the ACARS system.

CAPT. LAWRENCE: Okay, explain those remarks that you were just talking about for the pilot briefing?

MR. AMESBURY: When we prepare a flight release, it prints with a flight plan and a briefing package that, like I said, includes weather and NOTAMs. We will also -- if there is information that is necessary to the crew that is not going to be -- that is not included in the briefing package, we can type up that information in the remarks section of the release. That may be a simple notice, if we had a performance-limiting MEL that we had to make adjustments to the flight plan for. This is something that wouldn't print out on the briefing package. We could inform the crew of that in the remarks.

CAPT. LAWRENCE: Very good. Do pilots and dispatchers train together since they're so interdependent upon the operation?

MR. AMESBURY: No. No, we don't.

CAPT. LAWRENCE: Okay. And staying with you, Mr. Amesbury, the longer runway for 624 at Birmingham was closed

from 4:00 till 5:00 in the morning of the accident. The estimated time of arrival of the accident aircraft was 4:50. Let me ask you, do dispatchers at UPS have the authority to delay flights?

MR. AMESBURY: Yes, sir, we do.

CAPT. LAWRENCE: How are dispatchers instructed to use that authority?

MR. AMESBURY: How we basically -- we can delay the release time on the flight plan. We can also delay with ATC and contact the crew. Currently, if we were to get a delay -- say, in this case, if the dispatcher wanted to delay this flight, he would inform the bridge supervisor, who would have the contingency department actually put the delay into the system. This would update the times for the flight. And if the crew had already received the flight release, if the delay happened afterwards, he would have to contact the crew, reach out and verbally contact the crew to do that.

CAPT. LAWRENCE: Is there a list in any manual or guidance for the dispatchers that kind of gives a hierarchy of we want a delay for this, we want a delay for this?

MR. AMESBURY: No.

CAPT. LAWRENCE: And if so, would a closed runway, a primary runway closure be consistent with the delay policy?

MR. AMESBURY: No, it wouldn't. It's up to the judgment of the dispatcher. There's no specific guidance for that.

CAPT. LAWRENCE: Mr. Chestnut, we learned through the

investigation that the UPS dispatchers use the Lido/FlightPlanning system to dispatch flights. Can you briefly explain how the Lido system works at UPS?

MR. CHESTNUT: Lido is a flight-planning tool that is provided from Lufthansa in Germany.

CAPT. LAWRENCE: Could you pull the microphone --

MR. CHESTNUT: Sorry.

CAPT. LAWRENCE: Thank you.

MR. CHESTNUT: Lufthansa provides Lido. It's a flight-planning engine, and they're based out of Germany. And basically, all the weather NOTAMs, payloads, MELs, aircraft performance, tail assignments, the schedule, everything is ingested into the flight planning system. And then basically, it allows us to distribute and assign our scheduled flights to the individual dispatchers to set up the working desks. It has some functionality that allows us to monitor, actively monitor the flight after the paperwork is sent and in the in-flight phase --

CHAIRMAN HERSMAN: Mr. Chestnut, can you pull the mic closer?

MR. CHESTNUT: I'm sorry. We have an automatic monitoring system that basically provides information while the airplane is in flight, and it allows us the ability to provide leg policies, company policies, cost indexes, specific routes. Those are some of the general items that it does.

CAPT. LAWRENCE: Okay, thank you. And specific to some

of the paperwork, I just want to get a couple of questions answered as far as what we noticed in the dispatch paperwork. There was an area in the release -- or an area in the briefing area of the paperwork that said "Planned Runways." And for this particular flight, there was a planned runway for 17-Right departing Louisville, so I'm assuming that's the departure runway. It also said Birmingham 1-8 as a planned runway. And my question to you is does Lido determine the planned runway for the paperwork, or does the dispatcher do that?

MR. CHESTNUT: Ultimately, the dispatcher does that. Lido does have the ability to look at NOTAMs and identify any NOTAMs that are relevant to the airport, the runway in that time frame, and we'll identify which one is -- which ones are available. It's up to the dispatcher at that point to determine if that is actually the runway he wants to use.

CAPT. LAWRENCE: Thank you. And Mr. Rother mentioned 121.601, which talks a little bit about -- there's a quote in there, the PIC is required to receive information from the dispatcher regarding "irregularities of facilities and services that may affect safety of flight." Are you familiar with that regulation? Mr. Chestnut, sorry, I'm with you.

MR. CHESTNUT: I'm sorry. Say again. I thought that was --

CAPT. LAWRENCE: Yeah, 121.601 is the regulation that talks about the dispatcher's role in providing information to the

PIC regarding irregularities and navigational capabilities for the flight. Are you familiar with that regulation?

MR. CHESTNUT: Yes.

CAPT. LAWRENCE: Okay. Would an irregularity in a charted approach to an airport constitute a requirement to notify the pilot in command under 601?

MR. CHESTNUT: If that was known, it would certainly be something that you'd want to call out.

CAPT. LAWRENCE: During the Operations Group investigation, we had an opportunity to interview the accident dispatcher two times, and both times he told us that he was aware of the Birmingham approach to Runway 1-8, the localizer approach, and constituted that as a not valid approach because the chart said "Night N/A" in the minimums. So, in other words, it wasn't authorized at night according to the way he read the chart. My question to you is, what does UPS do to encourage open communications between the pilots and dispatchers with regards to these irregularities in navigational capabilities?

MR. CHESTNUT: I think we have to go back. The dispatcher did have a viable approach, and he was not planning on using 1-8 because of the note that was on the bottom of it that said it was not authorized at night. He was unaware that that note was there in error at that time.

CAPT. LAWRENCE: You said 1-8. You mean the localizer 1-8?

MR. CHESTNUT: Localizer 1-8. I'm sorry.

CAPT. LAWRENCE: So he was using the RNAV approach for the legality of the dispatch, correct?

MR. CHESTNUT: That's what he indicated.

CAPT. LAWRENCE: That's one approach to one runway to that airport. So my question is, what responsibilities under 601 does he have to contact the pilots to let them know that they have only one approach to one runway to the airport?

MR. CHESTNUT: There is no requirement. Our RCPM tells us that we can verbally communicate anytime we deem it necessary, and there are other items that must be communicated directly, and those basically revolve around maintenance items or changes after dispatch. The event of only having one runway available is not uncommon. Even a very busy airport could have one operational runway in service, and oftentimes we find that the runway that we anticipate we're going to use is not actually the runway that the crew actually gets because ATC changes it or there's a requirement to do so. So in and of itself, that is not an indicator that they would have had to reach out and notify the crew of that.

CAPT. LAWRENCE: Well, the dispatcher told us that he noticed that it was not authorized on the chart, but we also asked him if there was a NOTAM that made the chart legal. So this was the same chart that the crew had available to them. Is there no process that the dispatcher has available to him to either notify a supervisor, flight control, some support personnel that he sees

an anomaly in an approach chart that he's dispatching an aircraft to?

MR. CHESTNUT: I don't believe he saw that as an anomaly. I believe he saw that as a published restriction on the Jeppesen plate. There was no corresponding NOTAM that would have indicated that it was not in effect. And because he did have another viable approach, he elected to plan based on that.

CAPT. LAWRENCE: Okay. Let's bring up that viable approach, if you would, Mr. Soper. It's 2-V, page 8.

This was the RNAV approach, which was the only approach remaining that was available to the crew. And the minimums for this, the minimum descent altitude is still 1200 feet, which was about 556 feet above the ground. And the forecasted weather for arrival was a ceiling of 400 feet, which would have put the ceiling forecasted for arrival time below the minimum descent altitude for this one approach. My question to you is, what actions would be expected of a UPS dispatcher when ceilings were below the descent minimums for an approach to the planned runway?

MR. CHESTNUT: The approach is predicated on visibility. FAA Document 8050 clearly identifies which conditions a ceiling must be considered, and basically, if it is not published on the approach plate, that it does not have to be considered. The forecast that the flight was released on did indicate that there was a broken level at, I believe it was, 400 feet, so we did expect IFR conditions at that point, and certainly so should the

crew.

CAPT. LAWRENCE: And what would the actions be of the dispatcher at that point when he notices that the ceiling is that low?

MR. CHESTNUT: I think some of the actions -- and again, you know, the document itself is a communication. The flight crew accepts it and both the dispatcher and the captain acknowledged it. There was a planning phase, so the dispatcher did see that the weather was marginal and that there could be a good chance that we would have to go elsewhere, so an alternate was added to the flight release, which was Atlanta, I believe. And additional fuel was also added -- was present on the airplane that could have been used for holding or loitering or anything that was deemed necessary.

CAPT. LAWRENCE: Is there anything in the Lido system that notifies the dispatcher that he has a ceiling below the minimum descent altitude on an approach to the airport? Is there any warning system or alert or anything to notify him?

MR. CHESTNUT: There is an alert. In the initial planning phase there's an alert, and there would also be an alert post that. But in the planning phase, all the AIP information is ingested into Lido so it knows what the minimums are for each particular approach. And anytime any of those actual weather conditions meet that threshold, it is going to give you an alert, and basically what it's going to tell you is, hey, there's an

issue here, Mr. Dispatcher, go take a deeper look at this.

CAPT. LAWRENCE: Mr. Amesbury, if I could ask, what weather sources of information does a dispatcher at UPS have available to him as he flight plans?

MR. AMESBURY: The primary system is the flight planning system. This is the same weather that the crew received on the briefing package, so the METARs, TAFs, and NOTAM in textual form come into the flight planning system. That's our primary. We do have other applications. Our flight following system, Flight Explorer, uses Schneider Electric weather. We have WSI. We have multiple applications to get that information. The Lido, the flight planning system is the primary, though.

CAPT. LAWRENCE: Mr. Soper, you can begin bringing up 2-Alpha, page 35.

And let me ask either Mr. Chestnut or Mr. Amesbury, whoever wants to answer this, this is the weather, the sequence weather for 3:53 in the morning for Birmingham, and it shows at the very end of this sequence report a little area there called "Remarks." Can you see that? Mr. Amesbury, could you read what those remarks mean?

MR. AMESBURY: The remark was by ASOS -- or, I'm sorry, the METAR was by ASOS. The remark, ceiling 600, variable 1300 feet.

CAPT. LAWRENCE: What are remarks in a METAR?

MR. AMESBURY: These are appended by a certified weather

observer at the station. This observation was put out, the METAR itself was put out by an ASOS, and the remark is a physical person at the airport that's made an observation that's beyond that.

CAPT. LAWRENCE: Are these remarks important? Could they contain important information for the pilot?

MR. AMESBURY: Yes, they could. I mean -- yes, they could.

CAPT. LAWRENCE: Can you elaborate on that?

MR. AMESBURY: Well, in this particular case, considering the timing, I'm not really sure. I didn't have all the weather. But if you had, say, an approaching line of thunderstorms or something like that, the METAR may not -- the automatic observation may not inform you of that, but a person at the airport, the meteorologist at the airport may see an approaching weather and put that in a remark, so -- does that explain, does that --

CAPT. LAWRENCE: Sure. Let me go to Mr. Rother. From a general FAA perspective on this, how important are remarks to METAR, and subsequently how important they are -- information to a pilot?

MR. ROTHER: Certainly. First off, remarks are not always on a METAR. But when they are there, they are -- past legal interpretations that we have and our guidance in our handbook state that they are important and they are controlling and they need to be considered when making a determination to

conduct an approach or to operate the aircraft.

CAPT. LAWRENCE: Mr. Heinlein, would you like to elaborate on that as far as -- or add anything to that as far as the remarks and their importance? Hit your microphone, please.

MR. HEINLEIN: Basically, what Mr. Rother said is correct, and there could be many types of remarks. Sometimes it might be a ceiling and if a ceiling were required or was very critical to that approach. There are other things, for example, that they could put on there like volcanic ash north of the airport or something. There are many things that they could put there, observations that would be very critical to a crew, you know, for their safety.

CAPT. LAWRENCE: Thank you.

Mr. Soper, can you bring up Exhibit 2-U, page 4, and then we'll go to page 5.

And, Mr. Chestnut, our review of the pilot briefing paperwork for UPS 1354 showed that the METARs did not include remarks in any portion of the reports on the pilot briefing paperwork. This is a work order that was a request from UPS to the Lido support group to remove the remarks from the Lido system and the outputted information from the Lido system. Could you elaborate on why UPS wanted to remove the remarks from the Lido dispatch?

MR. CHESTNUT: There's a significant back-story to this.

CAPT. LAWRENCE: If you could be brief and just

summarize?

MR. CHESTNUT: Well, I think the first thing is just start off by saying that remarks are only present in the U.S. and Canada and Mexico when they are published. It is not the ICAO/IATA standard for the rest of the world, so the rest of the countries outside of the U.S. basically do not provide remarks. There are some variations in their METARs, that the U.S. also does not comply with. But the remarks were never removed from Lido. Lido is compliant with the IATA/ICAO distribution of METARs.

And we've got to go all the way back to 2004 to kind of understand. In 2004, when we originally acquired Lido, we did ask them for a supplemental weather feed that would provide the domestic-type METARs with remarks, and they were able to put an IT solution together for us that we paid them for. We were also in development with Lido for an in-flight monitor. It was an enhanced in-flight monitoring tool that gave both the flight crew and the dispatcher a great deal of situational awareness and was able to actually push information to both the dispatcher and crew when needed.

The supplemental feed of weather that was coming from Lido was basically making duplicate entries in the IFM to the point that it was obscuring what was very important in the IFM, and basically what we decided to do was go back to them and say, hey, how can you fix this? And their solution was, well, all we can do is turn this supplementary feed off, so that's what we did.

And at the time it was vetted through the appropriate personnel, through the vice president of operations, through the director of operations, and we elected to go down that path. But really, one of the primary reasons that that was acceptable was that it was our anticipation that the ATIS would contain those remarks if they were deemed relevant, and that's the guidance that they have, is that they must be there if they're relevant.

CAPT. LAWRENCE: Okay. We'll talk about the ATIS in just a minute, but you did mention that you had vetted this through some process with the flight operations department. Were they cognizant of this change?

MR. CHESTNUT: Yes, the flight manager was aware and was one of the signatories, as well was, i.e., the director of operations and the vice president of flight operations.

CAPT. LAWRENCE: Mr. Heinlein, I know you're on the dispatcher side, not the POI and such, but to your knowledge, was this information disseminated to the pilots of UPS that remarks were being removed from the METARs?

MR. HEINLEIN: I have no knowledge of any dissemination of that information because I wasn't even aware of it myself. It just came about, I think it was in 2011, and it's one of those things if you don't see remarks, you don't necessarily miss them, you know. So it's -- you know, you'd have to actually use the system all the time to be aware of it. So we really had no notice of that.

CAPT. LAWRENCE: Well, that's interesting. I want to expand on that a little bit, if I could. Should the FAA be apprised of this? Is this something that the FAA should have been notified on?

MR. HEINLEIN: Well, I have to say yes, I think we should have been, because I think they had some questions as to whether or not -- and they felt that it wasn't because of ICAO standard, but FAA and ICAO do not always match. And if they had come to me for a ruling, I would have had to research it, and I probably would have gone through Gordon Rother and some of these other people to make sure, you know, that it was there. So, you know, I don't know what else to say on that.

CAPT. LAWRENCE: All right. Are you aware of any other operators in the United States domestically that use the Lido system?

MR. HEINLEIN: I believe there's one other operator, and I think it's a small operator. It might be one or two, but there are not many carriers in North America that do use them.

CAPT. LAWRENCE: Would it be safe to say there are foreign carriers operating into the United States under the provisions of 129 that could possibly be using the Lido system?

MR. HEINLEIN: Yes, there would be.

CAPT. LAWRENCE: And, Mr. Soper, one last time, if you could pull up Exhibit 2-Mike, page 4?

While he's pulling that up, Mr. Chestnut, we're going to

see the weather that the crew, the accident crew requested via their on-board ACARS system while they were en route to Birmingham. And the weather came up at -- there it is right there.

If you could expand that just a little bit?

Have you seen this format before, this ACARS textual format, Mr. Chestnut?

MR. CHESTNUT: I have, but I'll say it's a little tough to read from here.

CAPT. LAWRENCE: Right. I'll help you with it. What it is, is it also -- there you go. In there is the -- the top line there where it says 14 -- go back.

It basically duplicates the 353 weather that they received; however, this is -- and it called for 1,000-foot, overcast, 6 miles visibility; however there are no remarks in this weather that was sent to the crew on their on-board computer. My question to you is, what is the source of weather information that populates the ACARS field that goes to the pilots?

MR. CHESTNUT: The weather source is from Lido. Ultimately, from multiple sources that feed Lido, and National Weather Service being one of those, but it is from the Lido database.

CAPT. LAWRENCE: So the Lido system that creates the briefing paperwork for the pilots prior to leaving does not have remarks in the METARs, correct?

MR. CHESTNUT: It does not.

CAPT. LAWRENCE: Okay. And then the on-board weather requests that the pilots receive does not have any remarks in their METARs, correct?

MR. CHESTNUT: That's correct.

CAPT. LAWRENCE: Okay. You might have answered this, but let me go ahead and ask both Mr. Amesbury and Mr. Chestnut both, how is a pilot, when he is airborne, going to get information like remarks in a METAR that may contain important information like the variable ceiling we saw on that weather report right there; how do they get the remarks out of a METAR?

MR. CHESTNUT: I'll answer that. Our flight crews are trained to -- when we dispatch based on the forecast -- the forecast was 400 broken -- the en-route weather is informational and they can call it up at any time that they want. But we train, and our FOM guidance is to rely on the ATIS and that ATIS will be the most relevant weather because it is the most timely weather, and that if there are any indications, you know, or remarks on there, that they will be available there. They're also available via the dispatcher. If the flight crew requests them, he could forward those to them.

CAPT. LAWRENCE: Mr. Amesbury, you would like to expand on that?

MR. AMESBURY: Yes. In order for the crew to get it, the dispatcher would -- in order for the crew to get the remark,

the dispatcher would have to send it to them from another system.

CAPT. LAWRENCE: But that would assume that the crew is making the request to have the remark sent to them, correct?

MR. AMESBURY: Correct. If the dispatcher noticed a remark that he thought was pertinent while he was looking at another system, he would do that on his own. I mean, he would -- if he felt it was a safety of flight information, he would do that on his own if he noticed it.

CAPT. LAWRENCE: Okay, we're going to pull up the ATIS that was published and broadcast to the crew as well, in just a moment.

While she's pulling that up, Mr. Heinlein, could you tell me the review process the FAA conducted to implement or allow Lido system at UPS?

MR. HEINLEIN: Actually, I cannot because they had Lido in operation before I started my employment with the FAA. I started in that office in 2009, and they already had Lido there.

CAPT. LAWRENCE: Well, as part of the ATOS oversight system for FAA when they're looking at these carriers, is the software for a dispatch program, is that something that you review on a regular basis?

MR. HEINLEIN: Well, the FAA doesn't really -- and Mr. Rother could probably answer this more eloquently than I, but we don't really approve a system, per se. They tell us what they're going to use and we look at the accuracy of a system and

we look at the various aspects of it for any problems, but we really don't have oversight over a flight planning system. If we have shortcomings, we'll address those. And through the ATOS process, there are many questions in the element performance inspection that address problems like that. But I had not run into anything of that nature, you know, any shortcomings of the system over my inspections.

CAPT. LAWRENCE: Thank you. When we interviewed you previously, you had told us that UPS would not dispatch a flight without the Lido system and that UPS would rather shut down the operation than work without the Lido software system. Does UPS have an alternative means to dispatch flights other than Lido?

MR. HEINLEIN: Well, yes, they do. They would do it in a very limited way on some of the domestic flights, and I think they would just move some of their more important flights, but they would not -- they would be severely cut back on their normal operation. They wouldn't run any of the flag flights at all.

CAPT. LAWRENCE: What does this involve; like taking a pencil to paper and doing the flight release by hand?

MR. HEINLEIN: Actually, Mr. Chestnut could probably answer that exactly. I've seen it, but it's not any sophisticated system by any means. It's just kind of a rough way of figuring a pretty close, you know, conservative numbers for releasing a flight, and then I believe you would have to fax weather and things of that nature, but it's not a complete package like the

Lido package.

CAPT. LAWRENCE: Okay, I'm interested -- because you're looking at him, so I want to ask you, though, is this something that the dispatchers are trained? Do they train how to manually dispatch a flight, and if so, do you observe that?

MR. HEINLEIN: Yes, I have seen the training in their basic -- in their initial training. I have not observed it in the recurrent. They go over an awful lot of topics in recurrent. I have not actually seen a module on that manual flight planning system. I've observed them sometimes when they actually will shut down that office if they had an emergency and they will actually set up another dispatch office, and I've observed them doing that. That's kind of their manual backup if they lost the building. But Lido has always been so stable. It's a very, very stable system. It'll go down for short times, and there are even banners there that will tell the dispatcher not to pull a release right now, it'll be back within, you know, a period of minutes or, at the most, maybe a half an hour. So they just won't release flights, but they can still flight follow and they can use all of their other systems, so just not planning flights.

CAPT. LAWRENCE: Okay. Mr. Amesbury, does UPS train their dispatchers how to manually dispatch and flight release?

MR. AMESBURY: No. We bring it up at initial, as Jack said, but we don't go any further. If the flight planning -- I can tell you, if the flight planning system went down, the air

operation would stop. It's a very laborious process to do a manual flight plan, and I don't see how that would happen.

CAPT. LAWRENCE: But the ability is in your manuals, correct?

MR. AMESBURY: Yes, that's correct. There is a, in our FOM, a manual flight plan -- or a manual flight release. It's not a flight plan; it's just a release. There's ability to do that.

CAPT. LAWRENCE: And I'm sorry. It's not trained or is it just talked about?

MR. AMESBURY: It is just talked about.

CAPT. LAWRENCE: That leads me to my next question, Mr. Rother. If we have a carrier that's operating with these software programs and such, are there any FAA initiatives looking at concerns regarding overreliance on automation by dispatchers?

MR. ROTHER: At this time we haven't formalized any national program to look at automation reliance or overreliance on these programs. So no, we have nothing right now.

CAPT. LAWRENCE: Going back to the manual dispatch to Mr. Heinlein, how do you know that -- if it's in their manual to do manual dispatching and it's in their guidance, how do you know they're proficient at doing it?

MR. HEINLEIN: Well, it would be one of those things that they would actually take out their manual and read how to do it. They would do it that way. They wouldn't just do it by rote.

But the thing is, is that this is just something that is

just inherent in so many dispatcher offices. When you lose your main flight-planning tool, you basically are just about shutting down the operation. You move a couple flights because you have to, but you're basically out of business when you lose the main system. So it's just a road that they don't go down except to maybe move a couple flights they have to.

CAPT. LAWRENCE: Mr. Chestnut, I asked Mr. Rother earlier from a more global perspective, an FAA perspective about overreliance on automation, but let me ask you as far as UPS is concerned. Is the carrier doing anything to ensure that their dispatchers aren't overreliant on the automation?

MR. CHESTNUT: Well, the automation is there and, you know, you use the automation to the degree that you need to use the automation. I don't think there's an overreliance of automation. Dispatch is very complicated. It is a global undertaking, and a dispatcher is involved in it throughout. There obviously has to be a great deal of information that's fed into it to bring that information to the dispatcher, but I don't see that we have a problem with automation being -- taking over for the dispatch role.

CAPT. LAWRENCE: Mr. Lovell, that's all the questions I have. I think Dr. Bower had some.

DR. BOWER: I just have one clarifying question.

Mr. Amesbury, previously, in response to Captain Lawrence's question regarding the judgment of the

dispatcher when one runway is closed, you said it would be up to the judgment of the dispatcher to delay for a closed runway. Just to get an idea of -- could you give me an example of a situation that will definitely cause a dispatcher to delay and another perhaps less serious situation that would cause the dispatcher to utilize his judgment?

MR. AMESBURY: Well, let's use this example here. The dispatcher had an available approach. The ceiling was forecast to be lower than the decision height for that approach. Typically, we would not delay for that reason; however, if there was something else like wind shear, or if there was some other factor or set of factors on top of that that would make it more dangerous for the crew to come down to that level before they execute a missed approach, they may delay it in that case, or if there was approaching thunderstorms or something like that. We do that -- it's fairly common for us to do that.

DR. BOWER: Thank you. I have nothing else.

MR. LOVELL: Madam Chairman, that's all the Technical Panel has at this time.

CHAIRMAN HERSMAN: Thank you, Technical Panel.

We'll move to the parties. TWU?

MR. PERSUIT: Thank you, Madam Chairman. We have a few questions. Mr. Chestnut, as far a the Lido workaround, I saw -- the workaround was done on August of '11; is that correct? The document that was up there for the remarks being removed from --

MR. CHESTNUT: Yes. It was in 2011.

MR. PERSUIT: The dispatcher for 1354, do you know what month or year he was hired?

MR. CHESTNUT: I do not recall exactly what month.

MR. PERSUIT: I think it was around '12. So is it possible that he was unaware that the remarks were not going through the Lido to the pilot?

MR. CHESTNUT: Yes, it is possible.

MR. PERSUIT: Okay. Mr. Amesbury, they talked about the CRM, DRM. Is there an FAA requirement for you to do a flight deck observation?

MR. AMESBURY: Yes, sir. We do a minimum 5 hours a year flight deck observation. We call it a fam ride, and that is also CR or DRM.

MR. PERSUIT: Do you find that beneficial?

MR. AMESBURY: We interact with the crews. It's very useful for both, yes.

MR. PERSUIT: Okay. Thank you.

Let's see. Mr. Rother, 121.533, joint authority with the captain. If the captain deviates from the flight plan, is he obligated to notify the dispatcher that he's not going to do that?

MR. ROTHER: Can you clarify the question as far as deviate from the flight plan?

MR. PERSUIT: Well, the dispatcher gives him a route, you know, from Point A to Point C, and he has to go to B to get

there and he's offered a direct or he takes a direct, is he obligated to tell the dispatcher that he's going to skip B?

MR. ROTHER: The flight plan and flight release is a legal document. It sets forth the terms, the conditions that the flight was planned and is to be operated under. Deviations quite often will require additional fuel. If a pilot deviates from the flight plan, he should follow his company guidance as far as what is the maximum deviation allowed. We have guidance in our Advisory Circular 120-101 for operational control that discusses that deviation and that continued coordination between the pilot in command and the dispatcher.

MR. PERSUIT: But he's really not obligated to say if he just skipped one of his waypoints and is making a shorter distance?

MR. ROTHER: It's hard to say. I mean, you skip a waypoint, you're planned to land at your max landing weight, you might be over your landing weight. I mean, there's many things that need to be looked at, and that's something that the pilot needs to evaluate in accordance with company guidance.

MR. PERSUIT: Okay, Mr. Amesbury -- actually, Mr. Chestnut, do you know, how many flights does a dispatcher release per shift?

MR. CHESTNUT: That would depend on if he's domestic or international. You know, we obviously have work agreements --

CHAIRMAN HERSMAN: Could you pull the microphone a

little closer?

MR. CHESTNUT: We have work agreements with the TWU and we identify what those maximums are. But generally speaking, domestically would be in the low 20s, and internationally would vary depending on the complexity of the flight, but could be 8, 9 flights.

MR. PERSUIT: I mean, with that workload that's there right now, would it be feasible to get pilot briefs via the phone to everyone of those and still be able to do your task management?

MR. CHESTNUT: To do briefs --

MR. PERSUIT: Verbal briefs with the pilot on every release that you wrote?

MR. CHESTNUT: I would have to look at that. My assumption would be that it wouldn't be able to be done with the number of dispatchers that we currently have, but again, I would have to take a look at that to see.

MR. PERSUIT: Do you agree with that, Mr. Amesbury?

MR. AMESBURY: No. We can have 20 flights leaving out of Standiford Field at night. They all leave within a 2 or 3-hour period. If the dispatcher were to pick up the phone, call, have a crew come and do the briefing, they physically wouldn't have the time to do it.

MR. PERSUIT: But you do pick up the phone if there's pertinent information that needs to go to the crew?

MR. AMESBURY: Absolutely.

MR. PERSUIT: Okay. And lastly, Mr. Rother, you mentioned a possible reason a dispatcher might reach out to a crew was for marginal weather. Does the FAA provide a definition of marginal weather?

MR. ROTHER: There's no specific definition of marginal weather. It's kind of left up to the operator to make that determination.

MR. PERSUIT: Thank you.

Thank you, Madam Chairman. That's all.

CHAIRMAN HERSMAN: Thank you. Airbus?

CAPT. HOSKINS: Madam Chairman, Airbus has no questions. Thank you.

CHAIRMAN HERSMAN: Thank you. FAA?

MR. DRAKE: Thank you, Madam Chairman. FAA has no questions.

CHAIRMAN HERSMAN: UPS?

CAPT. MILLS: Thank you, Madam Chairman. UPS has no questions.

CHAIRMAN HERSMAN: IPA?

CAPT. WHYTE: Thank you, Madam Chairman, just one question.

Mr. Chestnut, referencing Mr. Lawrence's exhibit where in 2011 you guys asked Lido to remove the remarks, at any time after that were the crew members notified via a must-read bulletin or a safety bulleting that those remarks were removed?

MR. CHESTNUT: I'm not aware of any bulletin that went out at that time. And truthfully, in retrospect looking at that, that would have probably been a more complete way of closing out the process. I do believe that the expectation was that we were going to rely on the guidance in the FOM to use ATIS to provide that information.

CAPT. WHYTE: Thank you, Madam Chairman.

CHAIRMAN HERSMAN: Member Weener?

MEMBER WEENER: I was just trying to understand by looking at the METARs for the time of -- well, the official 8:53 METARs called for 10 statute miles visibility; broken 1,000; overcast 7500 feet. So the official ceiling, then, would have been 1,000 feet, right, because it's broken? So this was the information that the crew had, and so this was what the crew was expecting to break out, at 1,000 feet?

MR. AMESBURY: Are you asking me, sir? Yes, until they received the ATIS, that would be the information they would have.

MEMBER WEENER: And what did the ATIS call for?

MR. CHESTNUT: The ATIS called for the same 1,000 foot.

MEMBER WEENER: Okay. So, had they had the remarks, 600 variable, 1300 as a ceiling, they might have been more alert to the fact that maybe the ATIS wasn't correct?

MR. CHESTNUT: The flight was originally released based on a forecast which would represent the weather conditions they should expect when they reach Birmingham, and that was 400 broken.

The expectation was that they were going to fly an approach down to 400 feet and potentially not be able to break out. The ATIS was the most recent weather available to them, and the ATIS is just a duplication of the METAR that's taken, and that measurement or that reading, depending on where that unit is on the airport, could have a great deal of variation from one approach end of the runway to the other approach end of the runway, and we see that quite often.

MEMBER WEENER: So they're anticipating, then, shooting an approach down to 400 feet on an approach that is limited to about 530 feet?

CHAIRMAN HERSMAN: Just kind of -- I know that you can't know what the crew might have been anticipating, maybe what the expectations are given the briefed material or something like that. If you could just rephrase?

MEMBER WEENER: Okay, let me change it slightly. Mr. Rother said that the remarks are controlling. What does that mean? Yes?

MR. CHESTNUT: Is that to me?

MEMBER WEENER: Yeah. I believe it was you that made the comment that the remarks are controlling.

MR. ROTHER: Yes, legal counsel has, in past interpretations, has stated that remarks, if present, need to be considered, and the worst weather conditions present need to be evaluated and determine if the approach should be conducted or

not.

MEMBER WEENER: So, would the worst weather, then, be considered to be the 600 variable, 1300?

MR. ROTHER: In the previous hourly, that did show that, that the crew didn't have, yes. They should have considered that.

MEMBER WEENER: So can they be cleared for the approach with 600 variable, 1300?

MR. ROTHER: Yes, because the requirement is to have the visibility to pass the final approach fix.

MEMBER WEENER: And the visibility was still considered to be 10 miles?

MR. ROTHER: Yes. The visibility was more than adequate for the approach.

MEMBER WEENER: Okay. Thank you.

CHAIRMAN HERSMAN: Member Rosekind?

MEMBER ROSEKIND: We've had a lot of discussions about reporting systems. So, Mr. Chestnut, Mr. Amesbury, you know, if something happens and there's an issue, you find an anomaly or whatever, who do you report that to?

MR. CHESTNUT: An anomaly with?

MEMBER ROSEKIND: You know, it's a chart that's got a wrong number somewhere, or I've been sending these people there all the time and the weather's always way off; anything that's sort of out of the ordinary that you think someone ought to take a look at and figure out do we need to make a change or something,

who would you report that to? How would you get that into the system so somebody's going to look at it and make a change for you?

MR. CHESTNUT: It kind of depends on what it is. It could be as simple as letting Standards, Flight Standards know and they would work through the appropriate channels. It could be an event report that is filed making -- indicating that there's something wrong, or it could be an ASAP report that is filed that would indicate that there's something wrong here and somebody needs to take a look at it. So those are some of the few.

MEMBER ROSEKIND: Okay. And I'm curious sort of from your perspective, how are sort of procedures and things maintained as far as updates and things go? And I'm not just talking about the stuff on the sheets, but just the practice, if you will, of dispatch. I mean, you're saying everything shuts down if, you know, if you're not operating. So, you know, who's sort of doing the ongoing evaluation to make sure it's, you know, the safest, most efficient, most informative process that it can be?

MR. CHESTNUT: I'm not sure I completely understand the question, but the process is -- we're a global operation and it is very complex, so, you know, automation plays a role. We look at everything we do every day, and some of those other mechanisms that I mentioned are out there as a way to highlight anything that is deficient, but, you know, we're very plugged into the day-to-day success of what we do and any of those concerns or issues come

to the top very quickly. Does that answer --

MEMBER ROSEKIND: Yep, that's great.

And, Mr. Heinlein, I thought I heard you earlier say, you know, where we don't have oversight. Can you talk about where you do, I mean, where the FAA has a role in oversight of the dispatch services that are provided?

MR. HEINLEIN: I'm sorry. I'm not exactly sure what you're quoting.

MEMBER ROSEKIND: I'm just trying to understand what role the FAA has as oversight for the dispatch services that are provided.

MR. HEINLEIN: I think I was talking about we don't really -- we don't approve a flight planning system. We don't do that. We have complete oversight over the carrier, though, and the safety of the, you know, the whole dispatch operation, operational control, dispatch flight release, the dispatch duty time, and their training. I have a complete oversight over that, it's just that I don't really -- we don't regulate flight-planning systems. I think that was maybe --

MEMBER ROSEKIND: That's the distinction I guess I was trying to get to with that one.

MR. HEINLEIN: Yeah. Okay.

MEMBER ROSEKIND: Great. Thank you.

CHAIRMAN HERSMAN: Vice Chairman?

VICE CHAIRMAN HART: Thank you.

I'm not sure I understood the answer to Member Weener's question, and so my question is, is the determinant of whether an approach may be commenced, is that determinant visibility alone, or to what extent does ceiling play a role in determining whether an approach may be commenced?

MR. ROTHER: Sure. We've had past legal interpretations on this, and the regulation requires visibility to be present. Visibility is controlling for the conduct of the approach. Ceiling is only required under an operation, say, for example, a circling approach, a circle to land, or a VFR type of operation where you're limited, and ceiling would be required in that case.

VICE CHAIRMAN HART: Okay. Thank you.

CHAIRMAN HERSMAN: I want to try to pull it back a little bit again, and so again I'm looking, really, for a 10,000-foot perspective on this.

When I think about the nature of the work that you do, and certainly when we've looked at it in other areas, it's about how you manage risks when you are deploying, and I'm curious to know, when you all actually make or create a dispatch, does it have a level of risk associated with it? People are talking about different pieces, about weather, about equipment, about different things, but do you get an overall sense of what the risk level of that particular flight is going to be, or the series of legs that you're dispatching the pilot on? Do you understand what I'm saying?

MR. AMESBURY: Yes. We do, we have an overall picture. It's a very extensive picture we have of the flight that we plan and follow, and we do numerous of the -- a dispatcher may have 20 of these flights.

CHAIRMAN HERSMAN: Sure. Okay. So let me simplify my question a little bit. So, if you are dispatching a flight, part of this is this relationship between the dispatcher and the pilots. You might have construction at an airport, you might have visibility or weather conditions, you might have some of the equipment out, you might have an aircraft that has something -- I don't know, you might have all of these pieces of it.

Do you have a scale of 1 to 10 of how much risk is inherent in this flight? Do you have a red, green, yellow? I mean, help me understand, how do you communicate -- and I don't mean about the specific things about what the weather, specific weather is at a certain ceiling or something like that. I'm just talking about the overall risk level of a flight so pilots know whether or not they need to be on the edge of their seats paying attention, you know, top of the game, or whether or not this is going to be something that is going to be straightforward.

MR. AMESBURY: Sure. It starts with what we know the crew has, what information they have. That's where everything starts from. We know what's in the briefing package as far as the forecasted weather, the MEL items, the airport -- the NOTAMs that tell the airport conditions. We know they have the approach

charts, the same charts that we do. So that's where it starts.

This information, if we both have the exact same information, we assume we'll draw the same conclusions and have the same picture of what's going on. When the dispatcher has other information that the pilot may not have, and the more of that information that's pertinent to that flight, that's when the levels go up.

CHAIRMAN HERSMAN: And how do you communicate those levels to the pilot?

MR. AMESBURY: Well, we start with the dispatcher remark on the flight release, which is just a text field. It's an open text field that the dispatcher can type in information that he has that he knows the crew doesn't have in their briefing package or their ships library. And it's a very small text field. You can't write a book there. So if it's just a couple of things that he can type in there and send it with the release, then he'll probably leave it at that. However, if there's something that can't be just typed out, like say I got a forecast, line of thunderstorms along the route of flight that the crew may not see or be able to see while they're reviewing their paperwork, I may pick up the phone and say, hey, along your route of flight there's a line of thunderstorms; I've routed you around this.

CHAIRMAN HERSMAN: Okay. But there's no overall risk level assessment?

MR. AMESBURY: No. No, there's no -- it's based on the

information that the dispatcher knows the crew has. And every piece that's pertinent to that flight that he knows the crew doesn't have, the more of that information, the higher level of alertness the dispatcher has, I guess.

CHAIRMAN HERSMAN: Do you have an authority to say no go?

MR. AMESBURY: Oh, yes, and we do.

CHAIRMAN HERSMAN: Okay. What threshold do you have to reach to say that? I mean, if you don't have an overall risk level, it's not meeting minimums?

MR. AMESBURY: Well, it's a safety -- if you take -- for the example of Birmingham, like I was saying, with the ceiling alone, to the dispatcher that would not be a reason to not go, because we know that -- or the dispatchers are under the understanding that an approach to the ceiling height, the decision height, that the crews are trained to do that, and that they're trained that if they don't see the runway at that height that they execute a missed approach.

CHAIRMAN HERSMAN: Okay. In reading through some of the other interviews that took place, there was a FedEx flight that was also coming into Birmingham very close to this same time, FedEx Flight 1488. That crew of that flight elected that they would prefer to wait for the main runways to be open with the equipment, and they were getting pretty close to opening those runways -- that runway. What is the risk level there? I mean, we

talked about earlier, in the other panels, maybe two landings a year that were non-precision approaches. I mean, is there a way to communicate and let them know, they're coming in, 10 minutes later the other runway is going to be opened up, that would reduce their risk? How do you communicate something like that?

MR. AMESBURY: The NOTAM would have indicated that the runway was open, was going to be open.

CHAIRMAN HERSMAN: So it's the pilot's decision about whether or not --

MR. AMESBURY: Yes, and it's a comfort level that the crew would have with conducting a non-precision approach that the dispatcher doesn't know. The dispatcher knows what we're authorized for, what the crew's trained to do, but as far as their proficiency or how many times a year they do that, the dispatcher has no idea unless the crew tells them.

CHAIRMAN HERSMAN: Okay. So in the FedEx pilot's interview he described Runway 1-8 as being a CFIT-moderate runway at FedEx. Does that mean anything to you?

MR. AMESBURY: Controlled flight into terrain?

CHAIRMAN HERSMAN: Sure. Right. But it sounds like it's some sort of scale or a rating system of some sort.

MR. AMESBURY: I'm not aware of the rating system.

CHAIRMAN HERSMAN: You don't have anything like that at UPS when you look at certain runways and you talk about what risk level there is?

MR. AMESBURY: The dispatcher doesn't, no.

CHAIRMAN HERSMAN: Okay. Okay. All right.

Thank you all. Any other questions from the Board Members? How about the Technical Panel?

MR. LOVELL: Yes, Madam Chairman, one more.

CHAIRMAN HERSMAN: Sure. We'll go back to the Tech Panel.

CAPT. LAWRENCE: I just have one question for either Mr. Chestnut or Mr. Amesbury. I'm curious about the cultural -- if there are any cultural barriers between the pilots and the dispatchers at UPS, because according to one of the interviews that we had with the dispatcher of 1354, he told us that he wasn't sure he would contact the pilots to let them know about the night unauthorized version of the approach chart for Runway 1-8 because, and I'm paraphrasing, but it's in the record as well, he didn't want to insult the pilot by contacting him and such. And I'm wondering, is there any cultural barriers that exist at UPS between dispatchers and pilots? Is there a fear that dispatchers have of pilots or communicating with the pilots?

MR. CHESTNUT: Let me take a stab at that, Matt.

I believe the reference that he was making was that this is -- reading a Jeppesen plate is basic knowledge to both the dispatcher and a crew member, and him pointing that out might have been speaking down to him, is the way I interpreted that. I don't believe there's a cultural issue between dispatchers and flight

crews. We have a similar DRM/CRM kind of requirement. We have a 5-hour initial, in our initial training, and then a 15-hour seminar that occurs between the 12th and the 24th month that we complete with the dispatchers, and then recurrent after that. We're aware of some of the issues, the fatigue issues, the situational awareness, and we try to train to those levels so we can help get inside their head and make sure that we're thinking about this thing the same way that we're [sic] thinking about it.

CAPT. LAWRENCE: I'm going to pass on a question. We'll try and read this. This is from Mr. Eick in the back, but he doesn't have a microphone, so I want to make sure that I capture this. And, Don, you know, let me know if I didn't get this right.

But this is to both Mr. Amesbury and Mr. Chestnut as well. Either one of you can answer it.

The FAA has approved the Air Carriers Adverse Weather Phenomena Reporting and Forecasting System under FAR 121.101. Does that system require full METARs, pilot reports, all advisory thunderstorms, low level wind shear, moderate and greater turbulence and icing, if the Lido system doesn't provide that, is the weather component limited? And I would actually direct this also to anybody on the panel, FAA included.

MR. CHESTNUT: I don't know about the document that you're talking about. I'm not sure that I'm completely familiar with it. We do have the ability to provide crews with METARs -- or with remarks. Since we have re-looked at this and we have done

our own risk investigation of this, and what we've done is we've decided that we're going to -- or look at proceeding with an alternate solution that would be able to provide that information to the flight crews, that piece that's missing. And hopefully, within the next 6 weeks we'll have that up and running, and that is what we're striving to do.

CAPT. LAWRENCE: And just one more question. There were thunderstorms forecasted within about 45 miles of the flight and there was no convective SIGMET issued. Should the dispatcher have issued some type of a notification to the pilots under 121.601?

MR. CHESTNUT: I don't believe there were any SIGMETs out there, or AIRMETs even, to notify them. If there was a hazardous weather notification, we would have been required to pass it on.

CAPT. LAWRENCE: I believe it was that there were thunderstorms that were in existence but there was no convective SIGMET. So if they have the in-flight monitor there and notice that there are thunderstorms but no SIGMET, should they have contacted the crew and let them know in that case?

MR. CHESTNUT: I don't recall exactly where the thunderstorms were. I believe they were quite a bit north of where they were, and it was a small, very isolated cell. So with not a great deal of familiarity with it, I couldn't answer that definitively.

MR. LOVELL: Madam Chairman, thank you. That's all the

Technical Panel has at this time.

CHAIRMAN HERSMAN: Great. We'll go back to the parties.

UPS?

CAPT. MILLS: Madam Chairman, just one question. It was mentioned that remarks were not present in the METARs, but I just wanted to clarify the record, and Mr. Chestnut, if you could just comment, or anyone on the panel. Were remarks present for the ATIS for this crew? Was the remark information actually present for the ATIS, which was the actual controlling, you know, weather information?

MR. CHESTNUT: There were no remarks recorded for the ATIS that was provided.

CAPT. MILLS: Thank you.

CHAIRMAN HERSMAN: Any other parties have any follow-up questions? TWU?

MR. PERSUIT: Yes. Mr. Amesbury, when you dispatch, do you dispatch to an airport or do you dispatch to a particular runway?

MR. AMESBURY: We look at all the available runways and we will plan our performance weight and our minimums based on the best available.

MR. PERSUIT: Okay, in this scenario there was how many runways available to the dispatcher?

MR. AMESBURY: There was one.

MR. PERSUIT: And that could be the reason that he had

dispatched to Runway 18 specifically here?

MR. AMESBURY: Yeah, there was no other choice for him to do that.

MR. PERSUIT: Thank you.

CHAIRMAN HERSMAN: Seeing no other questions from any of the parties, the technical panelists, or the Board Members, and we have no other witnesses to testify, the NTSB's investigative hearing into the crash of UPS Flight 1354 at Birmingham-Shuttlesworth International Airport is concluded. The record will remain open for additional materials requested during the hearing, and our factual investigative work continues.

On behalf of my fellow Board Members and the entire NTSB staff, I extend my appreciation, or our appreciation to all of the participants on all three panels and the parties that participated in the hearing. Thank you to the witnesses for their testimony and the parties and the party spokespersons for their cooperation. While each individual and organization here brings different knowledge to the table and has different perspectives, everyone has the same goal: to improve aviation safety.

I'd also like to acknowledge our staff from the NTSB's Office of Aviation Safety and the many other offices at the Board who provided support for this hearing. Thank you all for your hard work in preparation for this day.

The transcript is scheduled to be available to the parties within 7 days of completion of the hearing. Any

corrections to this transcript by the witnesses or the parties should be sent to the Hearing Officer, Mr. John Lovell, within 7 days of receipt. No, I'm sorry. You're going to give them 30 days, John, or 7?

MR. LOVELL: Thirty days.

CHAIRMAN HERSMAN: Thirty days. Okay, we'll get it within 7 days, we'll get it back out to you, and you have 30 days to get it back to us. Any documents or information that has been requested during the hearing that a party agrees to furnish the NTSB should also be sent to the Hearing Officer by that same date. I know John has probably been keeping a list of the IOUs, and he will make sure that you know what we have asked for.

Finally, each of the parties will be invited to put forward a submission for the record. Many parties have provided information throughout the course of the investigation. I know some of them are very keen on getting that information in the docket and in front of the Board for our consideration, as well as our technical staff for their review. There will be a time to do that. We have made some commitments to do some further work on specific issue areas. Dr. Wilson will be meeting with her team to look at some additional information in the coming weeks, and so we look forward to receiving all of that information from you all in support of your submissions as well. Those submissions will be reviewed, they'll be considered, and they are put in the docket for this accident.

The archive of today's webcast will remain on our website for several months, and the hearing transcript and all of the materials that have been entered into the docket will remain as part of our permanent docket available on our website.

Today we've shined a light on some valuable facts and circumstances of last August 14th to better understand the crash and to prevent similar accidents in the future. Our investigation is ongoing, and we will work diligently to complete our work in advance of the 1-year anniversary of this accident this coming August.

To the families, there are words etched in our training center entryway, and it says, "From tragedy we draw knowledge to improve the safety of us all." We will certainly endeavor to do that in this case.

We stand adjourned.

(Whereupon, at 4:40 p.m., the hearing in the above-entitled matter was adjourned.)

CERTIFICATE

This is to certify that the attached proceeding before the

NATIONAL TRANSPORTATION SAFETY BOARD

IN THE MATTER OF:	INVESTIGATION OF THE ACCIDENT INVOLVING UPS AIRLINES FLIGHT 1354, AIRBUS A300-600, REGISTRATION N155UP, ON AUGUST 14, 2013, ON APPROACH TO BIRMINGHAM-SHUTTLESWORTH INTERNATIONAL AIRPORT, BIRMINGHAM, ALABAMA
DOCKET NO.:	DCA-13-MA-133
PLACE:	Washington, D.C.
DATE:	February 20, 2014

was held according to the record, and that this is the original, complete, true and accurate transcript which has been compared to the recording accomplished at the hearing.

_____

Timothy J. Atkinson, Jr.
Official Reporter