IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

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STENOGRAPHIC TRANSCRIPT

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FRIENDS FOR ALL CHILDREN, INC., as legal guardian and next friend of the named 150 infant individuals, et al.,

Plaintiff,

-vs- : Civil Action No. 76-0544

LOCKHEED AIRCRAFT CORPORATION,

Defendant and Third Party Plaintiff,

-vs-

THE UNITED STATES OF AMERICA,

Third Party Defendant.

- x

Arlington, Virginia

Thursday, January 7, 1982

DEPOSITION OF ARLAND A. ATKINS

Huffington Reporting, Inc.
COURT REPORTERS
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Third Party Defendant.

Arlington, Virginia

Thursday, January 7, 1982

DEPOSITION OF ARLAND A. ATKINS, a witness herein called for examination by Counsel for the Plaintiffs in the above-entitled action, pursuant to notice, the witness being duly sworn by CLAIREEN M. HOLMES, a Notary Public in and for the Commonwealth of Virginia at Large, at the offices of Lewis, Wilson, Lewis & Jones, Ltd, 2054 North 14th Street Arlington, Virginia, commencing at 1:12 o'clock p.m., the proceedings being taken down by stenotype by CLAIREEN M.

HOLMES and transcribed under her direction.

APPEARANCES:

On behalf of the Plaintiffs:

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On behalf of the Defendant:

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CONTENTS

EXHIBITS

P R O C E E D I N G S

Whereupon,

ARLAND A. ATKINS,

a witness herein, was called for examination by Counsel for the Plaintiffs, and upon being first duly sworn by the Notary Public, was examined and testified as follows:

EXAMINATION BY COUNSEL FOR THE PLAINTIFFS

BY MR. McMANUS:

Q. Could you state your name, sir?

A. Arland Atkins.

Q. And your business address?

A. Itek Corporation, 10 Maguire Road, Lexington, Mass.

Q. And do you have a profession?

A. Yes.

Q. What is that?

A. I am an Electro-Optics Engineer.

Q. And what is that?

A. Basically at Itek I am manager of an Electro-Optics Laboratory which handles imagery data in electronic form.

Q. To a rather non-scientific person, that still doesn't mean a whole lot. Can you break that down even further, perhaps by giving me an example of what you might do?

A Essentially, we take materials, be it photographic or electronic imagery, put them into a computer then use the computer to display the imagery on a television-like display which we term as soft-copy interactive display. We are able to interact with the display while we are viewing it.

We then do various processing on the imagery including measurements and/or various types of filtering and standard -- what we call standard digital processing.

Q Standard what processing?

A Digital processing.

Q And what is the purpose of all of that?

A It's basically to extract maximum intelligence from a -- either an electronic or photographic image.

Q Now, in your testimony you have mentioned Itek. What is Itek?

A Itek basically is -- my division of Itek is the Optical Systems Division. We are basically in the field of aerial reconnaissance surveillance equipment. We build large camera systems that go in airborne sensors, mostly for the government for use mostly -- again, in military applications although we've also built for mapping the moon for the Viking Lander on Mars we built the camera and the laser recording system that reconstructed the imagery for that

system. It's basically reconnaissance applications.

Q Is Itek's primary function in the development and production of this type of machinery or equipment?

A In the camera systems and the -- the camera systems and the systems required to view and utilize the imagery from the systems, yes.

Q I take it that there are more than one division of Itek?

A There are several divisions, yes.

Q And you are in the Electric-Optics laboratory?

A I am in the Itek Optical Systems which is a division of Itek and I am manager of the Electro-Optics laboratory.

Q And what is the primary function of Itek's Optic Systems, is that--

A Yes.

Q Is that the broad --

A Itek Optics -- Itek Optical Systems, right.

Q Right. So that is the general category that you fall under; is that correct?

A That's the division of Itek.

Q Division. Okay. What is the primary function of that division?

A That is what I previously described. Itek in general has other more commercial activities outside of that division, eyeglasses, eyeglass frames and a lot of other -- photocopy machines, this type of thing but --

Q Those are other divisions?

A Those are other divisions outside of --

Q How much or what percentage of Itek's Optical Systems Division work is associated with the government?

A I don't know the exact, but a very high percentage.

Q 90 percent?

A Probably more than 90 percent.

Q Probably more. How long has Itek been in existence?

A Itek emerged during the World War II from Boston Research Laboratories. That's basically when Boston University stopped that laboratory and formed Itek in, I believe, the early '50's.

Q And the Optical Systems Division, how long has that been in existence?

A That was the original division. That's basically the original company.

Q Mr. Atkins, I show you what has been produced to us by counsel for Haight, Gardner, Poor & Havens and

represented to be your Curriculum Vitae. I'd like you to look at that and identify that, if you can.

A Yes. I presented that to them.

MR. McMANUS: I would like this marked as Atkins Number 1 and will make copies for you later on.

(The document referred to was marked as Atkin's Deposition Exhibit No. 1 for identification.)

BY MR. McMANUS:

Q Who prepared this CV, Atkins Number 1?

A Basically I prepared it.

Q Well, did you just give the information to someone or did you actually write it?

A I wrote parts -- most of it. Some of it was taken from the actual description of the Electro-Optics lab which we have a capabilities brochure at Itek. Some of that was taken from that and the rest of it I wrote.

Q Would it be fair to say that the portions that refer to you, Arland A. Atkins in the third person were not written by you and were taken from some other --

A No, it was --

Q -- publication?

A No, it was written by me but this is a standard format that our company uses to go into proposals, basically.

Q When did you receive your BA in Physics from the University of Vermont?

A 1962.

Q And you have a Master's in Electrical Engineering? Is that what MSEE means?

A Yes. Electrical Engineering and Electro-Optics in 1971.

Q And how long have you been -- could you give me your work experience from the time you graduated from the University of Vermont until the present?

A I started work at the Radio Corporation of America in Hightstown, New Jersey designing and building basically television cameras for space shoes, TIROS which is a weather satellite. These are some cameras that are used on weather systems basically; where I had some experience in the testing and fabrication of camera equipment. I spent four years at RCA and then came to Itek. I've been at Itek for 15 years now.

Q And how long have you been manager of the Optics Laboratory -- Electro-Optics Laboratory?

A Since -- I believe it was May -- April or May of

1981.

Q And what are your day to day functions as manager of the Electro-Optics Laboratory?

A Basically the way the laboratory is set up we're set up as a service organization for the rest of the Itek Optical Systems Division where we provide data processing and basically in the form of image processing services for the rest of the company. Right now I am a fairly small organization so I handle the scheduling -- I have two computers, two large computers. I schedule, I maintain prototype software for the computers, generate new algorithms and functions for the computers.

I do actual image exploitation from the data that other people give me and essentially in charge with the growth of the laboratory in terms of what new functions will be added and the types of processing that go on and that we handle there.

Q So, you are basically a support branch for the rest of the company; is that right?

A Right now, yes.

Q How much commercial business do you do?

A We are currently in a -- in medical image processing. I am doing a little bit in that area. Percentage wise,

that is probably 10 percent or so at this point.

Q And what does the medical photo imagery deal with?

A Essentially what we're doing here is soft-copy processing systems lend themself to what we call real time processing, being able to take data into the system and view it in some form of process manner immediately. The imagery that we are working with in the medical field, we are building equipment that will take the output from X-ray machines, real time fluroscopy so that the doctor can see while he is in the operating room, actually watch the functions, the internal functions to the body in an enhanced manner.

Q Is Itek in any way owned or associated with the Lockheed Aircraft Corporation or any of its many subsidiaries?

A Not to my knowledge.

Q How did you and Itek become involved with this particular case?

A My first contact was Robert Macomber of Aeroeco Corporation called into Itek in general, not to me specifically. He called our Photo Science Department, told them what he was interested in, in the form -- some form of processing on imagery and they referred him to me and essentially that was the first --

Q And what was the gentleman's name again?

A Robert Macomber.

Q M-a-c-o-m-b-e or o-m-b?

A M-a-c-o-m-b-e-r, I believe.

Q He is with Aeroeco?

A Aeroeco.

Q How do you spell that?

A A-e-r-o-e-c-o -- yeah, e-c-o.

Q So, it is all one word?

A I think it is all one word.

Q Is there a hyphen or a slash between the Aero part and the eco part?

A I don't believe so. I'd have to look at the business card.

MR. CONNORS: For the record, you may not be aware of this, he is listed in our list of experts.

BY MR. MCMANUS:

Q Who is Mr. Robert Maccombe?

A I, essentially have been introduced to him as the President of Aeroeco which has some form of photo analysis type company who, to my knowledge, has been employed by Haight, Gardner.

Q Do you know, did Aeroeco do any work for Haight, Gardner in conjunction with the type of work that you have

been doing?

A. They are working on the case, but as far as working with me or all. it's just the initial contacts when Mr. Macomber brought me the original negative that I worked with.

Q. Do you know, is Aeroeco owned by or in any way associated with Lockheed or any of its subsidiaries?

A. I have no knowledge.

(Discussion off the record.)

THE WITNESS: I have no knowledge in that area.

BY MR. McMANUS:

Q. Before Mr. Macombe --

MR. CONNORS: Macomber.

MR. McMANUS: Macomber? That's how he spelled it, but he pronounced it Macombe. Macomber -- strike that.

When was the first time you've ever met Mr. Macomber?

THE WITNESS: Late November of this year -- of 1981.

BY MR. McMANUS:

Q. And had you ever heard of him or Aeroeco before that time?

A. No.

Q. Do you know why Mr. Macomber referred the work to

you?

A. He told me when he first called that he was referred to Itek because we had worked on some processing for some films a number of years ago, basically the Kennedy Assassination Films. We had done some processing -- specialized processing on those films.

Q. Was that in conjunction with any litigation?

A. It was, I think, a part of the Warren Commission and I don't -- I really don't know the details.

Q. Were you involved in that?

A. Only on the peripheral at that point.

Q. When did Mr. Macomber provide you with negatives?

A. It was right around Thanksgiving time, just after Thanksgiving.

Q. Okay. Do you recall how many he --

A. He -- his original contact, he came into Itek to view my system and view the capabilities and with him at that time he did bring a series of -- he had both prints and negatives of which he left me I think about nine. I have the exact number in the receipt; but something in the order of nine.

Q. Do you have that receipt with you today?

MR. CONNORS: Okay. I have a problem in one

respect. At this point, Mr. Macomber was operating as a consultant to our firm for litigation purposes and I don't know to what extent this would fall under the work product. I am perfectly willing to give you the substantive information in this. Basically, it is a receipt signed by Mr. Atkins for some 35 millimeter negatives Numbered 18 to 21. Further, 35 millimeter negatives Numbered 8 through 12 and two and a quarter by three and a quarter film negatives, three in number. But they were unnumbered as such. That's basically the factual information that would come from that and it's dated 30 November, 1981.

MR. McMANUS: Well, we will ask for production of that.

MR. CONNORS: Well, as I said, I'm not sure the category this falls into. I certainly don't mind having the Court take a look and decide, but I'm not going to waive any work product exceptions at this point.

MR. McMANUS: I understand that. I'm just telling you that we are going to make a formal request for it at some point. And what is the date of that again, please.

MR. CONNORS: 30 November, 1981.

BY MR. McMANUS:

Q Mr. Atkins, does that date refresh your

recollection as to when you first had contact with Mr. Macomber?

A The first contact essentially was by telephone a few days -- now, the Thanksgiving holiday occurred in there, so it was like the week -- I think it was like the Friday before Thanksgiving, in that range.

Q Had anyone else contacted you prior to Mr. Macomber's having contacted you about the work you have done in conjunction with this lawsuit?

A No.

Q So, he was the first contact you had?

A Yes.

Q When he brought you the negatives, what did he tell you he wanted you to do with them?

A Essentially at this point we were to put them into the computer system and basically see what I could -- see what I might be able to do with them in terms of measurements, enhancements. Just the normal processing that I would do with imagery; what would the resultant pictures look like and we weren't -- we didn't really have a firm fixed set of tasks basically. It was just to digit scan, digitise them and put them into the system.

Q Do you recall which or do you have any way of

identifying which negatives were first brought to you as reflected on that receipt?

A The negatives had numbers on the filmstrips themselves. At that point, I had no other reference other than the film numbers.

Q Do you know, are they --

MR. CONNORS: For the record, I think the numbering refers to the crayon numbering put on by your photographic expert onto the tissue slip of the Walker Three Negatives.

THE WITNESS: No. No. These numbers were the actual Kodak Frame Numbers on the negatives because we had no other way of identifying at that point. So, in order to have the receipt proper, that is the way we defined it. We later on did have the crayon envelopes that came with the receipt.

BY MR. McMANUS:

Q Are those negatives reflected in any of the slides that you have produced in conjunction with your work in this case?

A At least parts of them, yes.

Q We are going to go through them later on. Do you think you would be able to identify those which are now given to us as your Exhibits?

A In general, yes. On the early set of slides, they are numbered the same as the negative numbers. On the later set of slides, they are converted into a new set of numbers.

Q Can you tell me what you did when you got those slides, the first batch from Mr. Macomber?

A Well, essentially the first process in converting a piece of film into our -- into the computer is to put it through a scan and digitize process which we essentially convert the density position on the negative to a set of numbers. We essentially go in in XY fashion across the negative and precisely locate each point as we're moving in the two directions and at each point determine what the density value is, convert that density value to a digital number and that is what we store in the computer, a matrix so to speak. An XY coordinate system with a set of digital numbers attached to it.

Q And what is the purpose for that?

A That is so we can -- essentially, that is the only way that we can then read the images out onto our display system. We have to be able to read numbers. We can't read in terms of a density basically in the system.

Q And what sort of information are you trying to get by going through this process?

A At that point all we are trying to do is duplicate the information that occurs naturally in the negative.

Q So, you are transferring the picture image just to a system of numbers in the computer?

A Right.

Q And that is the scanning and the digitizing process?

A Scanning and digitizing. Right.

Q And what happens next?

A The -- once these are scanned and digitized they are -- the output of that is a computer tape, magnetic tape. We then take the magnetic tape, put it into the computer, read it in and I store the results and the set of numbers on a computer disc so that I can later recall the exact coordinates, the sets of numbers and be able to recall any portion of the image back to my soft-copy display system.

Q And what is a soft-copy display system?

A In this case, a soft-copy -- it's similar to a television system in which the numbers that the computer has stored are converted into brightness levels on the television monitor and the coordinates systems are maintained.

Q So, in other words, once the picture has been scanned and digitized into a numbering process by the

computer the software -- what is it? Soft-copy.

A Soft-copy.

Q Soft-copy process is then taking those numbers and projecting them onto the screen so that you can see the picture --

A So that you can visually see the picture. Right.

Q And what is the purpose of that entire proceeding?

A In general, a photograph contains information that the visual system cannot see. Very subtle changes in density, contrast brightness, however you want to define -- the areas in the photograph that may be fairly dark, the eye can't discriminate very subtle differences in those dark areas. At the same point, very large areas in the image that may be quite light, the eye can't discriminate any variations in the lightness. Putting it in as a soft-copy display, we can, in fact, if there is any difference in the numbers at all, in the density, we can use those differences to expand the contrast and so that we get an optimum visual presentation of the data, what we call the dynamic range of the soft-copy display is greater than the film system. You're able to display a lot more gray levels on the soft-copy display than you are in the standard film presentation of an image.

Q Can you give me an example?

A. It's hard to give you an example without showing visually what would happen, but basically I have the classic photograph that I use on the display where they have photographed a room from the outside. It is a boiler room from the outside with open doors. The area surrounding the room is all visually very -- very nice high contrast. You can see the building and all of the features of the building. The area behind the boiler in the room is very dark and on the film you see nothing in that area. On the soft-copy display I can present that area so that I can actually see the details that were present in the real image there and this is called contrast stretch.

Q. Is it possible to use this process to put on a screen more detail than the human eye can perceive?

A. Yes.

Q. And how is that possible?

A. In two manners. What we are talking about now is contrast or gray level rendition and not magnification. I can address magnification later if you want to, the spatial aspects of the picture. First talk about the contrast. The human visual system is capable of possibly 30 0r 40 shades of gray, distinguishing 30 or 40 shades of gray at any one time. On this particular display system, I can display

because I have a color capability and I can display some of the gray shades in colors and with various numbers attached to them I can display 1,024 levels, discreet levels which the visual system can then pick up.

Q When was this system developed?

A This is a -- it's not a specific system. It's a -- soft-copy displays are sort of a generic term that many people are using nowadays. They have been around for several years. The actual use of computerized imagery has been around for -- I really don't have a good feel, probably 15 - 20 years; but these, where the ability to scan, digitize and then go to high revolution soft-copy display systems within the last, you know, within 10 years. Probably less than 10 years.

Q Are there any textbooks that are used in conjunction with soft-copy displays or any of the processes you have been describing?

A There are a number of texts on digital image processing and I don't have authors and titles right here, but I could get a couple of the classical ones. There are a number of papers in the area coming out of the University of Southern California, particularly author Harry Andrews relating to this type of thing. There have been articles in

almost all of the major magazines, at least the layman's description in Scientific America, et cetera.

Q Do you have those articles at your disposal at your office?

A I -- yes. Essentially, we have a full library at Itek.

MR. McMANUS: I call for the production of those articles and the textbooks that Mr. Atkins has been referring to.

MR. CONNORS: Do you want me to bring in his entire library?

MR. McMANUS: Yes. You have asked for more than that from us, so that's the least you can do.

Now, Mr. Atkins, have you ever testified in Court before?

THE WITNESS: No.

BY MR. McMANUS:

Q In conjunction with the same type of work that you have done for Lockheed?

A No.

Q Have you ever been deposed before?

A No.

Q About this sort of -- have you ever been asked to

do this type of work before?

A Wreckage-type work?

Q (Mr. McManus indicated in the affirmative.)

A Basically not that specific, no. The standard work that I do is to extract intelligence from imagery which entails measurements, location of objects, identifying objects, this type of thing. That's what I do on a daily basis.

Q But you have never testified in Court before?

A No.

Q Or even at a proceeding like this, at a deposition?

A No.

Q Now, after the first set of slides was then put up -- went through the soft-copy display stage what happened next?

A Essentially Bob Macomber looked at them to see what we -- he thought we could further do essentially in the area and what type of processing that we might put on to these particular images. And at that point, I had produced the sample images with annotation, with arrows, with different things on them to bring back to Haight, Gardner so that they could see the -- what the output would look like. At that point --

Q Do you have copies of those?

MR. CONNORS: For the record, they have been provided to Plaintiffs' counsel.

BY MR. McMANUS:

Q Is that some of the stuff that is here on this table?

A These.

Q So, you gave back to Mr. Macomber these four prints; is that correct?

A There were those four prints,plus a series of negatives and I think there probably were -- I don't recall if this was the only prints or not but there were more negatives -- more slides. They were presented in a slide fashion.

Q Would those -- the more slides that you have referred to, would those be among those that we are going to be looking at shortly?

A I think it was the group of the first 42.

Q 42?

A Right.

Q Okay. Now you have got me a little confused. I thought that you got perhaps nine to a dozen initially from Mr. Macomber?

A Nine to a dozen pictures, but I can break a picture up into many different forms. Use a small blowup, a big blowup, annotated, non-annotated and that's essentially why -- I think that there's also duplicates of some of the slides in the different output media that I have. Basically I work on a soft-copy display. I do all of my work on the soft-copy display. There's no physical record except what I can term as the output. And the output in this case takes the form of either a photograph of the television screen or a laser scanned constructed photograph and that's essentially what these are.

Q All right. You were initially given 12 photos by Mr. Macomber?

A Yes.

Q And from those 12 photos you then produced 42 slides; is that correct?

A Yes.

Q So there were just those 12 photos that you used as the basis for your work?

A I didn't use the entire 12 photos. I only used a partial set of those 12.

Q All right. At any time were you provided with any other photos?

A After this set was delivered and essentially these were visually optimized and annotated only. I was then -- we then agreed that I was going to make some measurements on some other negatives which were later supplied.

Q Can you identify those?

A Essentially those are the set called the Marine Photos and I think there is 17 negatives in that set.

Q So that is a total of 29 photos?

A Approximately, yes.

Q Well, I'm not holding you to exactly 17 as being the second number.

A Yeah.

Q But approximately 29 photos. And were all of those photos provided to you by Mr. Macomber?

A Mr. Macomber actually brought the first set. The rest of them -- everything that I received after that came by air carrier -- air courier from Haight, Gardner.

MR. CONNORS: May I talk about something here?

MR. McMANUS: Sure.

MR. CONNORS: When negatives were provided, they were the original Walker Negatives and we did not cut them into discreet packages, so there would have been additional negatives perhaps on a strip. In other words, Marine only

used one out of a strip of four. The whole strip was sent because we were not going to destroy that by cutting it up. So, there may have been more negatives than that produced at that time. I don't know what he is referring to by the 17.

THE WITNESS: The 17 were the actual ones that I used from the Walker set and numbered by the Walker Numbers that were adjacent to the frames, the negative frames which I also received but basically didn't scan and digitize.

BY MR. McMANUS:

Q Did you even look at them?

A In the negative form I am sure I did, but --

Q So, basically, it was 29 photos that you worked with?

A (The witness indicated in the affirmative.)

Q And those first 12 were provided to you by Mr. Macomber and there were rolls provided to you by Haight, Gardner of which 17 -- approximately 17 were designated as the ones you should be working with; is that correct?

A These were cut strips; negatives, four or five per strip.

Q So then all of the photos that you were provided -- strike that.

Is it fair to say then, Mr. Atkins, that the photos that you worked with were not photos that you chose from say a whole group of photographs?

A No. Basically, my task was to work with the Marine-type -- the Marine Numbered Photos. I did I think work with a couple outside of that range, but that was prior to receiving those.

Q So that's -- the couple outside of the Marine Photos would have been those from the first 12 that you received?

A Yeah. They were included in the first 12. They weren't identified as Marine Numbers at that point. I scanned and digitized one of those and subsequently used the one right beside it or something like that.

Q Now, you said when Mr. Macomber first brought you the initial 12 photos he asked you to see what you could do with them?

A Essentially, I showed him what the capabilities of my system were on imagery that I had -- that I normally would work with in the system and essentially what we were going to do was to see if we could in fact see the subtle differences that he was interested in on some of the photos that he provided.

Q Did he tell you why he was interested in the subtle differences or why he was interested in these photos at all?

A Yes.

Q And what did he tell you?

A He basically described the accident and told me what he was interested in finding out at that point.

Q How did he describe the accident?

A Basically, he said that the aircraft had malfunctioned -- something had malfunctioned at high altitudes, 20,000 feet or thereabouts and had ruptured some hydraulic lines or some control lines, that the pilot no longer had full control of the aircraft. It came down, it was able to come in toward the airport, landed a couple miles short of the airport and the pictures that I was looking at were the actual wreckage site.

Q Anything else? Did he tell you the speed of the airplane, size of the airplane?

A I knew it was a C5A. Basically I am familiar with with the C5A. They do land at Hanson Field which is right beside Itek. That's the only feeling I have there. I had notidea of the speed and really it wasn't of interest to me, both features. I don't recall him saying anything about both.

Q But you did see pictures of the wreckage?

A Yes. I saw it on the initial visit by -- Mr. Macomber had pictures which I -- additicnal pictures to the negatives that he left. He left the negatives, but he had also some photos.

Q Do you know --

A And I have no idea which ones --

Q -- which photos they were?

A No, I don't.

Q Were they designated in any way?

A I don't recall any designations. It was just general site-type pictures, overall views.

Q Do you recall any more precisely what the photos depicted?

A I don't. No. I think that most of them were subsequently ones that are very similar to the Marine pictures.

Q Did he describe to you the litigation that was going on?

A Only in the very briefest of terms.

Q And what were those brief terms?

A He said that there was a large suit filed against Lockheed Corporation by an organization of adoptive parents

of the survivors of the crash. I don't recall exact numbers or anything like that.

Q And he told you that the plane landed a couple miles short of the airport?

A He said that the wreckage -- I would say that his words were the wreckage area was -- this river area was a couple miles short of the major runway or something.

Q From the pictures that you have seen, it is obvious that the plane simply didn't land; is that correct?

A Well, the plane came down into a field obviously. It did not land on the runway.

Q Well, there wasn't a whole lot identifiable as a plane left; isn't that correct, sir?

MR. CONNORS: Objection.

MR. McMANUS: You can answer.

MR. CONNORS: You can answer.

THE WITNESS: Well, I could -- with all of the parts that I could see, I could definitely tell that it was an airplane. As far as identifying what type of airplane if I weren't familiar with airplanes, I would have a hard time.

BY MR. McMANUS:

Q In fact, if you didn't see the tail section you would probably have a hard time even describing any of the

other parts as being from an airplane; is that correct?

MR. CONNORS: Objection. You can answer.

THE WITNESS: No. I would -- there were obvious parts. Wheels and structures that were quite obvious from the aircraft.

BY MR. McMANUS:

Q Now, you mentioned that Mr. Macomber described the accident to you and told you what he was interested in. What was he interested in?

A Essentially, first it was the -- on the west side of the river, the ground disturbance caused by the aircraft and essentially we were looking was the ground disturbance from the river bank or where did the ground disturbance occur between the river bank and the troop compartment was the prime object that he was interested in. On the other side of the river I did also have something he cited over which you could see the initial -- some touch down points and although I have subsequently made measurements in that area, I didn't measure full tracks or anything like that.

Q So, his initial interests were just to measure the tracks from the river bank on; is that correct?

A Was to see if I could visually optimize the subtle differences in the disturbed areas in that section of the

ground.

Q That's what he told you he was interested in you finding out?

A That was the first thing. The second thing was actual measurements relating the distances of various objects or various occurrences, various what have you on the pictures.

Q And did you tell him at that initial meeting that you could?

A I told him that I was quite sure. Already on the display we could see that we could visually optimize the subtle differences in the disturbances. We also -- I also showed him the measurement capability that I had and it was quite obvious that we were going to -- if we could in fact identify objects on the ground which were of a known dimension, then we could in fact make measurements.

Q What are your measurement capabilities?

A A Once we have scanned and digitized the photo and put it into the syetem we essentially set up a coordinate system over the photograph. Depending upon the parameters we use for scanning, it is a very accurate set of coordinate systems, I can then go into that coord nate system and count pixels; in this case picture elements. This is -- each

individual number in the computer is a picture element. I can actually count picture elements and the computer can designate the length between any two end points that I specify and I can specify that interactively by locating a cross or a fiducial mark on the display itself.

Q Can pixels be changed to manipulate a photograph?

MR. CONNORS: Objection. What do you mean by manipulate?

MR. McMANUS: To change the image.

MR. CONNORS: Put some feature in there that is not there?

MR. McMANUS: Or take some feature that is there out.

MR. CONNORS: You can answer.

BY MR. McMANUS:

Q Either way.

A Basically, it is a number and what you have to do is compare that number with the surrounding numbers. You can do things to the numbers. Some of the types of processing that are available which we haven't used here would in fact modify those numbers so that you are introducing information that is not contained in the original image. The processing that we did on these pictures were the scanning

and digitizing and then the contrast stretching which basically give you the -- a relative change between two pixels. It does allow a relative change, but is -- does not introduce information that wasn't in the original photograph.

Q But you can change a picture that way?

MR. CONNORS: Objection. What do you mean by change a picture that way?

MR. McMANUS: Well, I think Mr. Atkins --

MR. CONNORS: I think his answer already addressed that, exactly what he did and what could be done.

BY MR. McMANUS:

Q You can go ahead and answer.

A Oh, okay. You can change the visual rendition of the picture. You can bring out features that are in the original picture which you couldn't see originally. You can express features that were originally there essentially, but -- and there are, again, types of processing that you can do which totally changes the image. But, again, we did not do those type processing.

Q Now, what sort of experience have you had in measuring from pictures?

A Day to day activity. One of the tasks that I am required to do is to actually make measurements of objects in imagery and this is a normal function built into the computer system. Basically, I am not doing any measurements. All I do is locate the point in the image that I want to measure to. I locate two end points and the computer

actually calculates the actual measurement inbetween.

Q Does the computer have the capability of measuring angles?

A Yes.

Q How?

A Now, the angles that we're talking about here, we have to refer to the XY grid structure of the original scanned image. The way the display is set up is -- it's a series of grid lines in two directions across the display up and down on the display, equally spaced lines. Essentially, then in order to measure a distance all I have to do is count pixels between any two locations and subtract the coordinates. In order to get angles, I have to measure the coordinate -- the two coordinate points, the XY coordinate points in either case. And then by normal trigonometric means, go over and calculate what the actual angle is. So, it's very straightforward. It is just a counting type of problem; but the angles that you measure are then based upon this XY grid structure that you have in the system.

Q Does that take into consideration the depth perception or the depth of a picture?

A The pictures that you see on the screen are two dimensional perspective type pictures. We are essentially

working in a two dimensional world. Everything is projected onto that two dimensional display so that basically you -- no. The angles that you measure are in the two dimensional plain. You can't measure a three dimensional angle on that because you don't have the third -- a third depth.

Q So, how do you measure that? Through mathematics?

A You -- yeah, you would -- if you wanted to measure that type of an angle, you would have to mathematically determine what your projection of the original image was.

Q So, that's more than just counting pixels.

A That would be more than counting pixels possibly. If you knew the characteristics of the camera system that you took the original image with and you knew the characteristics of the -- the location of that camera, the look angles that we think of, then it's still a matter of counting pixels and scaling in three dimensions basically.

Q Well, you would have to take into consideration, as I think you said, the angle of the camera to the image that you're trying to measure, isn't that correct? So, in other words, if you had an aerial photograph which was directly vertical to the area that you wanted to measure -- in other words looking straight down, that would simply be a matter of counting pixels, is that correct?

A. Provided there were no distortions in the taping system, yes.

Q. Well, if it's looking straight down, why would distortions have any effect?

A. Well, because in an optical system basically the dimension's away from the center, the optical axis of the system can be distorted. As you go from the center to a corner of the format on the -- on the picture, you can in fact get a compression or expansion and these are known as pin pushing or barrel distortions and things like this. If you have a good optical system, a low distortion optical system, a picture that was taken at some distance you are less likely to have this type of distortion. What I'm saying, in general a vertical -- vertical photography where the field of view -- where the frame size -- angular frame size is quite small, then you wouldn't have to normally worry about that. If it was a very large wide angle, a typical wide angle will give you a distortion.

Q. But if there were no distortions, it would simply be a matter of counting pixels, right?

A. Right.

Q. Now, as one moves off the vertical plain and moves down towards the horizontal with the area to be

measured, you can no longer simply count pixels, is that correct?

A. And one dimension you can't. If the picture is taken like most standard photographs are with the object -- with the man centering on the object he's looking at, any line that's horizontal in the frame is basically the same scale. So that if that were set up as my "X" dimension, any measurements along any one of those lines would be the same, but each line would be slightly different and the difference in the other direction, into the scene direction could be accounted for by a trigonometric function.

Q. So then mathematics would come into play in making measurements at that point and it would be more than simply counting pixels?

A. Yes.

Q. Now, after Mr. Macomber told you what he was interested in, did you put the negatives that he brought with him right up on a soft copy display?

A. About a week later.

Q. So, he had to come back?

A. He came back.

Q. And it was at that time that you told him you could --

A At that time --

Q -- measure?

A He took the resultant hard copy and brought them back to Washington here and at which time I heard from John Connors that we should proceed with the measurements and go on from there.

Q All right. What precisely were your -- was the task you were given?

A It basically was to take the negatives that I received from them --

Q So that would be the Morain negatives now?

A The Morain negatives and compare the measurements of the Morain, if I felt that was the proper way to do it. They also, at that time, gave me what they said were correct dimensions of objects on the ground which I could use as reference points.

Q So, you did not measure the reference points yourself, is that correct? That information was given to you?

MR. CONNORS: Objection.

THE WITNESS: The actual dimension of the object in feet was given to me.

BY MR. McMANUS:

Q Do you recall what the reference objects were?

A Yes. It was a tire which was I think on Morain -- let's see. Walker Photo 748. The tire was at the corner of the field. Actually, it wasn't that tire. It was a -- the dimension they gave me was for the tires on the C5A. They gave me the -- a tail dimension which was described from a report that I received a copy of the report from John Edwards with those dimensions in it. The total length of the troop compartment as it was configured in the photo, that included front to back and not necessarily just the troop compartment; and also had a dimension of the diameter looking into the rear of the so-called troop compartment.

Q So, all of those measurements were furnished to you, is that correct?

A Those were furnished to me.

Q So, if there had been any mistakes in those measurements, that would throw off any subsequent calculations that you made, is that correct?

A All of my calculations are based on those measurements and would have to be changed if those need to be corrected.

Q And again, the measurement for the tire was given to you in terms of this is how wide a C5A tire is as opposed

to the tire in this picture is --

A. No, the maximum diameter of a C5A tire and there's a description of it in the John Edwards report of the general tire.

Q. Do you have those measurements with you that you were given?

A. Yes.

Q. Could you give them to me?

MR. CONNORS: May I see those, please?

There are two things. The Edwards report that he refers to has been produced to the Plaintiffs before.

MR. McMANUS: An Edwards report has been produced before.

MR. CONNORS: Yes.

Give me the other one.

Okay. What I'm producing to counsel now is the Edwards report previously produced to Plaintiffs' counsel, report for John Edwards. In addition to that, Mr. Atkins has in his file a letter from Mr. Macomber with some factual information and also with some word product information in it and I have no objection to reading the factual information into the record. I'm sure counsel will request the document. However, because, again, of my concern for Mr. Macomber's

status at that point as a consultant I am not going to produce the document but I will read at this time the factual information into the record.

MR. McMANUS: Well, I do request production of the document and hope that Lockheed doesn't think that they can have a series of people designated as consultants, et cetera to pass information back and forth and therefore protect that information.

MR. CONNORS: Not at all. Certainly not the factual information, but I am concerned about his role as a consultant in the litigation.

MR. McMANUS: I would like before you do that, sir, I would like to have this Edwards report marked as Atkins Exhibit Number 2 and I will get you copies for that.

Perhaps if Mr. Atkins could read the information.

MR. CONNORS: The information that is factual in nature is contained in a bracketed portion at just below the bottom halfway point on the page. He can read that.

THE WITNESS: The -- essentially what it is, there is a Morain Report Number -- Page Number which is a reference and then the aircraft structure, the component, the Morain dimension and then the what is called the correct dimension. And here I have penciled in two corrections on the dimensions

there which essentially was telephoned to me the same day I received this and it came out of the Edwards report. It's just a typographical error or what have you from that, so the Morain Report Page 5, the tire, the Morain dimensions 3.75 feet. The correct dimension on the typewritten letter was 4.06 feet or 48.75 inches. My penciled in annotation was 4.02 feet. That came from the John Edwards report.

BY MR. McMANUS:

Q So, in other words, we have three measurements for the tire?

MR. CONNORS: Objection.

BY MR. McMANUS:

Q The one that you found, one that Mr. Morain listed in his report and the one that John Edwards gave, is that correct?

A No. No. The three are -- I received the letter saying these were the correct dimensions, but at that point I did not have the Edwards report and I don't think Mr. Macomber did either. He received the Edwards report the same morning that he sent this out and correct those two numbers from the Edwards report. None of these are my dimensions. I didn't make any measurements. All I did was note from a telephone conversation with -- with John Connors the change

dimension and the next one which is the tail dimension.

Q Well, there are still three tire dimensions listed there, is that correct?

A Including the penciled in one?

Q Yes.

A Yes.

Q What are the three sources again of that information?

A Morain dimension from the Morain Report, the correct dimension and, again, I don't know where that came from other than it's written into this letter received from Mr. Macomber. And then the penciled in number which came out of the John Edwards Report Mr. Macomber called into me.

MR. CONNORS: I want the record to reflect when he says correct dimension he is referring to the title at the top of that column and not as a representation that that is the correct dimension. Obviously what he means is that it was corrected later by the telephone call.

Go ahead.

THE WITNESS: The second is the Morain Report, Page 21, the tail structure. The Morain dimension was 34.75 feet. The typewritten dimension was 35.12 feet and the telephone corrected dimension was 39.92 feet.

BY MR. McMANUS:

Q Now, what is the genesis of the corrected or the penciled in numbers?

A That's because I attribute it to a typographical error. I don't know where these numbers came from. So, I just can't comment on them. All I know is I received the letter and at the same time I received a telephone call saying that those two dimensions were listed wrong. The Edwards Report says they should be and I changed those to reflect the Edwards Report.

Q All right. And that is in a letter to you from Mr. Macomber on Aeroeco stationery, is that correct?

A Yes. The other two dimensions are Morain Report Page 28, troop compartment -- listed as troop compartment. The Morain dimension was 65 feet. Under the column correct dimension typewritten on this letter 75.67 feet; and the fourth is -- there's no telephone -- that was the same as -- the fourth is Morain Report Page 32, again, troop compartment. That is general editing. The Morain dimension of 232 inches and the -- under correct dimension typewritten 254.42 inches.

Q And you don't know where the information under the heading correct dimensions come from, is that correct?

A I know that some of it comes from the Edwards Report. Where the first two dimensions came from, I don't

know.

Q. Were you provided with a copy of Dr. Morain's written report?

A. Yes.

Q. Did you compare it to see if any of his figures matched up with those in that letter from Mr. Macomber?

A. I compared basicallY the two dimensions that I subsequently used later on which is the tire dimension and the troop compartment length dimension, 65 feet.

Q. Do you know what photogrammetry is?

A. Yes.

Q. Could you give me what your definition of it is?

A. I don't know how close I can come to the real definition but it's basically making measurements off of photographs.

Q. Are you a photogrammetrist?

A. Not by title or by degree or by any piece of paper. I do what's -- what I consider photogrammetry, what Itek considers photogrammetry on a regular basis, yes.

Q. So, you recognize photogrammetry as a science?

A. Yes.

Q. Are you a geographer?

A. I would say no.

Q Do you have any training at all in geography?

A No formal training.

Q You were asked to compare the measurements of Dr. Morain, is that correct?

A Essentially, yes.

Q What were you going to compare them to?

A What I was basically asked to do was to make my own set of measurements off the same photos that he used and utilizing the dimensions that were given to me for ground objects, come up with comparable type measurements from comparable points basically; and I didn't do a point by point comparison with everything he's done in his report. I took the ground disturbance marks on the west bank measured over all which will show up in some of the later photographs that I have and measured certain points, certain objects, distances data. I didn't use the same techniques -- basic same techniques that he used, at least same objects that he used.

Q So, you did not use the same reference points that Dr. Morain used, is that correct?

MR. CONNORS: Objection. Go ahead.

THE WITNESS: I used the same end points for the final measurements but not necessarily the same objects to do

my proportions of scaling from.

BY MR. McMANUS:

Q Why was that?

A On the east side of the river I did use the tire. My measurements were based upon the tire in Photo 748. I used the same tire because that is an object which is readily available to us in the proper format; and on the other side of the river I found that I could better go to some object that occurred in the natural photos that I had which I thought that I could then relate a cross a series of photos. Dr. Morain used people essentially for measurements in a number of his proportions and people, without knowing an accurate dimension of the person, I find that kind of difficult to utilize. So, I try to use only the dimensions that were supplied to me as true scale dimensions.

Q Well, you couldn't use those in all of the photographs that were provided to you, could you?

A In those that I made measurements on I could, yes. And I --

Q Well, you understood that your task was to disprove Dr. Morain's measurements, didn't you?

MR. CONNORS: Objection.

THE WITNESS: It was to compare. Essentially,

I really had no contention of disproving or anything else. I was working independently, making a set of measurements from the -- basically from the west bank to the troop compartment to see if I could come up with an independent set of measurements. Subsequently they will be compared, obviously, but that wasn't my task.

BY MR. McMANUS:

Q. Well, you knew that Dr. Morain had been retained by the Plaintiff in this case?

A. I read his report and received his dimensions.

Q. And you knew he was retained by the Plaintiff?

A. Yes.

Q. And you knew that Lockheed was the Defendant, the other side?

A. Yes.

Q. And that's who you were doing your work for?

A. Yes.

Q. And you didn't expect that Lockheed was asking you to prove that Dr. Morain was right, did you?

MR. CONNORS: Objection. You're arguing with the witness.

You can answer the question.

THE WITNESS: That's not the way I professionally

do business. I was asked to make a set of measurements and that's my task and that's what I did.

BY MR. McMANUS:

Q And it did not occur to you to use the same reference points and the same reference items that Dr. Morain used?

MR. CONNORS: Objection. He said he did use some of the same reference points that Dr. Morain used.

MR. McMANUS: Some but not all.

THE WITNESS: Well, if you go point by point, Dr. Morain made many more measurements than show up in my photos although I think you will be able to come up with comparable types of numbers from my photos. The thing is he essentially proportioned from people in several pictures. I've taken measurements from a couple of pictures and related them back to the ones that he actually made measurements in.

BY MR. McMANUS:

Q So basically, you both had different methods and approaches to reaching the various measurements?

A The standard photogrammetry requires that you have a known ground dimension and then you can proportion from that, yes.

Q But his methods and approach was different from

yours, is that correct, because he measured different objects

A. The objects -- the objects in some cases were different, but the basic measurement approach of measuring a scaled object and then proportioning other objects in the scene are similar.

Q. Okay. But since you didn't measure exactly the reference items and the reference points that Dr. Morain did, you are not in a position to say that he was wrong in his measurements, is that correct?

MR. CONNORS: Objection. That doesn't necessarily follow. And again, you are arguing with the witness. He can answer to the extent he can.

THE WITNESS: The thing is I don't have dimensions I don't think for every dimension that Dr. Morain had specified in his report. The overall dimension that I am looking for is the disturbance marks from the west bank to the troop compartment and that is the ones I've concentrated on. I believe I have used the same points as reference and so that I can measure from a particular object or place in a photo to the end of the troop compartment at the same position he did. And we do have comparable measurements basically that way.

BY MR. McMANUS:

Q But since you don't have all of the measurements that he took, you are not in a position to say that he was wrong, are you?

MR. CONNORS: Objection because you haven't related that to what he measured and what he was asked to do as compared to what you asked Dr. Morain to do.

MR. McMANUS: Well, counsel, he was asked to compare and to check Dr. Morain's measurements and he didn't measure all of the same things, then you are not really in a position to say whether or not Dr. Morain was correct or incorrect, isn't that so?

MR. CONNORS: Dr. Morain's report covered several different areas and when he said he didn't use the same measurements he obviously as he stated referring to some of the human figures which Dr. Morain thought he could use as scaling features and you are mixing apples and oranges in the question and that is the problem I have with it. Note my objection.

MR. McMANUS: I note your objection.

Can you answer the question, Mr. Atkins?

THE WITNESS: You can compare my measurements directly with Dr. Morain's for the ones that I have presented. They are of identical things, so that I can do a direct

comparison. I don't have all of the dimensions of all the objects that Dr. Morain has I don't think. I might have. But I haven't done a point by point comparison with Dr. Morain's report at this point to see.

BY MR. McMANUS:

Q So at this point you can't tell me if he's right or wrong?

MR. CONNORS: As to what measurement?

BY MR. McMANUS:

Q As to any measurement, if you haven't completed an analysis point by point.

MR. CONNORS: Again, I think counsel and the witness are talking about two different things. Why don't you ask him about a particular measurement.

MR. McMANUS: Well, we will get to a particular measurement. He's told me he hasn't -- he didn't use all of the same reference points as Dr. Morain, is that correct?

THE WITNESS: I didn't use the same objects necessarily in the same pictures that he used.

BY MR. McMANUS:

Q And he used more than you, is that correct? I believe you said that before.

A He may -- he looked at areas other than the troop

compartment. He looked at areas out to the wings. He looked at areas to the -- where the pilots' area was and to the tail and things like that. Basically, I haven't done those. My main concern was from the measurements from the riverbank to the troop compartment. In that case, that measurement differs from Dr. Morain's.

Q I understand that they differ. My question is you were not in a position to say that his method and his approach and his measurements are incorrect, is that right?

A Only to the -- my feeling of the accuracy of my measurements.

Q But you weren't on the scene?

A Definitely not.

MR. CONNORS: Neither was Dr. Morain.

MR. McMANUS: I understand that.

So he used one approach and one method and you used another, is that correct?

THE WITNESS: No. I -- basically, we have used the same approach and for parts of the measurements we have utilized identically the same objects and where we have, my numbers differ from his in two aspects. 1, I used a different scaling factor than he did and the scaling factor is derived from the set of measurements that we talked about a few

minutes ago, the troop compartment measurements and the tire measurements. The numbers I am using are slightly different than Dr. Morain's for those objects.

BY MR. McMANUS:

Q The second?

A That would account for part of the -- the difference. The rest of the difference would be how accurately you can actually proportion measurements and how accurately the techniques -- not -- the measuring tools that we each had available to us.

Q Now, Dr. Morain used more scaling reference points, is that correct?

A Not for the same measurements that we just talked about.

Q And how were the scaling factors different?

A We just read the difference between the Morain dimension and the dimension that I had received in the -- either the telecon or the letter basically and you have those dimensions.

Q And you don't know where either of those sets of dimensions came from, is that correct?

A I do -- where Dr. Morain's dimensions came from, I have no idea other than the Morain Report. The other

dimensions, the dimensions that I used, basically that's what we are talking about, the difference between my scaling dimensions and Dr. Morain's, came from the John Edwards Report.

Q So then you are relying on Mr. Edwards?

A I am relying on Mr. Edwards. Right. His report.

Q So, of course, if Mr. Edwards is wrong then your figures would be off?

A I scaled all of my figures based upon those dimensions.

Q How important is the scale factor to reaching your measurements?

A The scale factor in mensuration in this type of mensuration is the only way you can come to an accurate measurement and this is anyway due to Dr. Morain's measurements were exactly the same way based upon a scale factor. You multiply the scale factor times the -- another proportional dimension that you have measured and consequently if you are wrong in the -- your scale factor, you are also wrong in your final dimension.

Q All right. Now, I believe you told me a short while ago that you felt Dr. Morain used the -- basically the same approach as you did?

A Same technique, different measuring instruments.

Q His measuring instruments are acceptable measuring instruments, are they not?

A Depending upon what you're trying to measure. I really can't -- they're acceptable for certain types of measurements, yes.

Q Are they acceptable for measurements of this type?

A My feeling is that for some of the objects that were measured, the accuracy which he can in fact discern the known dimensions are not good enough, no. There was quite a bit of subjective on his part. There is a certain subjective view that he has to look through a radical or look through a fiducial mark on the measuring instrument to the photograph, determine on the photograph whose scale -- basically, he measured off five by seven photographs and the scale of the photographs may not be adequate to determine the actual end point of the object that you are looking at. And so there is a possible error source in 1, locating the end point and 2, in reading where the actual scale falls with respect to those end points.

Q Well, if someone is trained in reading these instruments, they can do an accurate job, isn't that correct?

A Depending upon the scale entirely.

Q Do you know what scale Dr. Morain used?

A. He used the five by seven photographs which essentially would be about a five X blowup of the original, five times enlargement of the original photograph.

Q. Well, you don't have any reason to believe that Dr. Morain's methods were incorrect, do you?

A. The overall method of taking a scaled object and proportioning it to another object and seeing is standard practice. The accuracy of precision, again, and the choosing of the scaled object is where the differences occur.

Q. But those are purely subjective standards, isn't that correct? In other words, he didn't do anything unusual or out of the ordinary in measuring the object that he was measuring?

A. No, but it does -- the method that he -- the measurement instruments and the scales that he used would definitely affect the accuracy of his measurements.

Q. Are you saying that it was not possible for him to get an accurate reading with the scale that he used?

A. No. That it may be possible with a fiducial scale if enlarge the image to the proper size so that you can in fact measure points so you do know that you are looking at an edge of an object rather than somewhere just slightly to the left or right of the edge essentially.

Q Of course, it depends on what you're looking at too, doesn't it?

A It totally depends on the task, but in this case the accuracy of measurement is the dependant upon how large the scale object is. The larger the scale object, the more accurate you can make measurements. Going from a tire which is four feet on a picture which shows a scene of several hundred feet, the accuracy is not as good as though I have an object in that same scene of several hundred feet which I knew the measurement of.

Q But if one did know the dimension of an object several hundred feet, one could then be accurate?

A You would be more accurate. More accurate, yes.

Q Other than using different measuring tools, your approach and Dr. Morain's approach were the same, is that correct?

A I would say the technique in photogrammetry is the same, yes.

Q And is it fair to say that the primary difference between your measurements is as a result of the different scales used by the two of you?

A That would be definitely one item and also the fact that when I put an object on the soft copy display I can

better differentiate a point that I am measuring it to and I can measure it -- in my case, I can measure it down to one pixel value and can discern, for example, where the end of the troop compartment is within one pixel.

Q. But Dr. Morain did make more measurements than you did, isn't that correct?

A. I believe he did, but I won't -- again, I wasn't to measure all of his dimensions. I was basically concerned with the troop compartment.

Q. Have you completed all of the tasks that have been asked of you in conjunction with this project?

A. All of the ones that have been asked to date, yes.

Q. Before we look specifically at the size that you took, what are the differences between your measurements and Dr. Morain's measurements?

A. I really haven't done a straight comparison. I will present my measurements and it's really not my task to do a straight comparison between the two. It hasn't been my task. My task was to come up with the -- what I felt were the dimensions.

Q. Well, you have looked at Dr. Morain's, is that correct?

A. I have looked at Dr. Morain's report, yes. I don't

recall the comparable measurements that he has to the measurements that I have. The only one that I can -- mine vary a few hundred feet in the riverbank to the troop compartment and there's a variation. I don't know exactly what that is. I have to look in his report and compare it with mine number on the slide there. I haven't committed it to memory.

Q Well, do you anticipate that you will be asked to do that?

A At this point in time, I really don't know. I have submitted what I call the most accurate measurement that I can make and that -- that is the output of my task.

Q And is that reflected on all of these photos?

A That's reflected on those photos, yes.

Q Well, I understood that you were to compare Dr. Morain's. When do you plan on doing that?

A That's compare in the loose sense of making sure that I made the same -- measured over the same areas that he measured and that's what I had agreed upon for the word compare, not on a measurement by measurement basis throughout his entire report.

Q So then you can't tell me today even if there are differences between all of Dr. Morain's measurements and all

of your measurements?

MR. CONNORS: I will have to object to that. If you want him to take the time to read Dr. Morain's report right now and go point by point with his measurements, you are welcome to do so; but don't say he can't compare them because he certainly could do it if you want him to do that. The point is he has not sat down and does not have that committed to memory which is what I think he has just stated.

BY MR. McMANUS:

Q Can you without looking at the report tell me even whether or not there are differences?

A I can tell you there are differences. I cannot tell you what the differences are. I can tell you my numbers in general. All the numbers that I report are, I believe, different than Dr. Morain's.

Q And you are not saying who is right or wrong, you are just saying that they are different, is that correct?

MR. CONNORS: Objection.

THE WITNESS: My feeling is that --

MR. CONNORS: Wait a minute. My objection is who is the who in that question?

BY MR. McMANUS:

Q You are not saying that the measurements -- you are

not saying that Dr. Morain's are right or wrong, but you are merely saying that his measurements are different from yours?

A. To the best -- to my best technical judgment, my measurements are correct.

Q. Are you then saying that his are incorrect?

A. I am not -- I don't have that task.

Q. Mr. Atkins, did you bring with you today your entire file regarding the project you have been asked to do by Lockheed?

A. Almost. The -- what I don't have here obviously is what is in the computer and the way I work basically is store a lot of the data in the computer. All the images -- the latest images that you have including the annotation, the numbers and all are stored in the computer so that I can regenerate those at will, basically, at this point. There's also copies of some of the documents which I received that I don't have with me at this point, but basically I have what the photos and all that I have generated -- copies of the photos and all that I have generated plus some of the notes; the characteristics of the scan system, the -- some verification of measurements. The computer measurements I always verify by hand as I go along just to be a hundred percent certain and I've got some of the verifications just

in handwritten notes and some of the descriptions of the ones I have scanned and digitized a photograph in order to bring sections of that photograph up to the screen for display. I have to know the coordinate locations and so I keep track of the coordinate locations of certain of the pictures, things like that. That's basically what I have here.

Q I'd like to see that and mark all those so if there is any other items that you feel are subject to some sort of privilege, you might want to look through them, Mr. Connors.

MR. CONNORS: Okay.

MR. McMANUS: While you are doing that, why don't we take about a five-minute break.

(A short recess was taken.)

MR. CONNORS: I have given to Mr. McManus the bulk of Mr. Atkins' file. I did not give him the copies of the slides which were already produced nor the second copy of Mr. Atkins' Curriculum Vitae which Mr. McManus said he did not need. I also withdrew a single-page document listing items which were sent to me by Air Currier on December 15, 1981. There are four categories listed. Basically, these are the negatives, prints and positive black-and-whites and some other type of print that we have already produced to

Plaintiffs. The reading basically accounts for negatives, prints, black-and-whites which are called Dunn camera prints, D-u-n-n camera prints; and upon information, I believe copies of all of those with the exception of the negatives have been furnished to Plaintiffs' counsel and Plaintiffs' counsel was furnished with prints made from those negatives, however, we have retained the original negatives.

BY MR. McMANUS:

Q Mr. Atkins, you have several copies of photographs in your files, some of which are duplicates?

A Yes.

Q Are all these photographs generated from the original two sets of 12 and 17?

A Yes. The difference in what you see there are some are generated from the original negatives without the going through the computer and some are computer -- after going through the computer are generated. So, there's a set of prints of the original negatives that I used as references.

(Pause.)

MR. CONNORS: While the Plaintiff's counsellor is reviewing the file, I should also note that we produced today copies in both slide form and in 8 by 10 black and white

print form of various materials prepared by Mr. Atkins as well as a slide tray which we have brought here of the slides which he has prepared in what Mr. Atkins advises me is in reasonable order. I just want that in the record because I don't have a document showing the production of this material.

BY MR. McMANUS:

Q Could you go through the photos that were in your file, Mr. Atkins, and try and pull out for me as best you can the 12 that were originally given to you by Mr. Macomber and then next set of approximately 17 that was forwarded to you by Mr. Connors.

A They include the same -- there is an overlap.

Q An overlap? Okay.

A In those pictures, so basically, this set here is taken from the original negatives and they are just blowups of the original -- prints of the original negatives. This is the 17 negatives -- no, I take that back.

Q There's more than 17 there.

A There's two or three more. I know the extra ones - when I had them printed, the man printing them printed negatives on either side of the ones that were of interest to me.

These are duplicates and were not used. They were just -- this was used originally.

MR. CONNORS: The record should reflect that Mr. Atkins is separating the photographs into piles for Mr. McManus --

THE WITNESS: These two were not used ever.

BY MR. McMANUS:

Q Those two piles?

A Well, they're the same photos --

Q Oh, I see.

A They were never used. They were just printed inadvertently and they got -- this one was one of the original negatives that was given to me which is the negative which I will say Walker 339. Basically, we used the one beside it, Walker 340 for our Morain type measurements but I did originally make measurements from this of the original 42 pictures that you have. Many of the 42 pictures are of a section taken from that image. These other images are the -- there should be 17 here.

(Pause.)

These are the 17 which correspond to the Morain pictures.

MR. CONNORS: Now, for the record, there are numbers

on the back. Could we put them in the record, please?

MR. McMANUS: Sure. Why don't you give them to me.

THE WITNESS: I think they're all here.

MR. McMANUS: The numbers on the back of those 17 photos that Mr. Atkins has stated or that -- or designated by Mr. Atkins is the Morain photos are as follows: 335, 338, 269, 321, 257, 735, 736, 748, 262, 340, 761, 83, 187, 757, 762, 300 and 767. The other pictures that Mr. Atkins has referred to as being one from which many of the 42 slides were drawn from has no number on the back of it.

THE WITNESS: I think that's number 339.

BY MR. McMANUS:

Q 339?

A Yeah. It's the negative that's beside 340 and --

MR. McMANUS: I'll see if we can get copies of all of these.

(Discussion off the record.)

BY MR. McMANUS:

Q Doctor, is it fair to state that your function then in looking at these photos was simply to make measurements of certain aspects of the photos?

A Yes.

Q. Did any of your tasks have anything to do with photo interpretation or enhancement of photos?

A. Well --

MR. CONNORS: Well, I'm going to object. It is a compound question. I think there are two distinct subjects there.

BY MR. McMANUS:

Q. The first one. Photo interpretation.

A. Well, mensuration is an obvious task of photo interpretation so, in that sense, yes, photo interpretation.

Q. I am specifically talking about details in photos as opposed to making measurements. I am trying to determine, if, for example, something depicted on a photo is a dike or a piece of airplane wreckage, something like that.

A. Basically, no. I was able to examine those photos and find the same object without being able to -- without having to identify it necessarily to make measurements to it.

Q. So, your sole task was measuring them?

A. Yes.

Q. Okay. Now, I'd like to show you --

(Discussion off the record.)

BY MR. McMANUS:

Q. Before we get to the slides, Mr. Atkins, I'd you to

again explain to me what are these four pictures.

A. These -- okay. These particular pictures were generated on a laser scanner.

Q. Was that done by you?

A. By me, yes. They were taken from -- after I scanned and digitized the original negatives, put them into the computer, I reconstructed the image on a laser scanner.

Q. What is a laser scanner?

A. A laser scanner -- there are three output methods for my soft copy display: Photographing the screen, the television type screen with two separate cameras or taking the pixel by pixel values and writing it on a piece of film with a laser. The laser is moved across the film and the brightness of the laser change to -- to get the density. We have the laser scanner essentially that generates this type of picture.

Q. So, the laser scanner can make a picture darker or lighter as you may want to choose, is that correct?

MR. CONNORS: Objection. I don't think that's what he said.

THE WITNESS: No, the --

MR. McMANUS: I'm not suggesting that it is. I am asking him isn't that correct.

THE WITNESS: It's actually reconstruction. Basically, it's not a lot different than a standard photographic camera and the only difference is each individual pixel is illuminated separately whereas a standard camera you would illuminated the entire picture and snap one frame of data. The laser scanner writes one pixel at a time across the image.

BY MR. McMANUS:

Q And just as one can set a camera to have a darker or lighter image, one can use a laser to make each individual pixel lighter or darker, isn't that correct?

A We can adjust the exposure of the film on the laser scanner or on a camera. Basically what I should state at this point is all of my measurements and all of my work is done on a soft copy display system. The hard copy output is only in lieu of bringing my display to wherever I have to present data. I can't do that. The quality of soft copy display is much greater, much better than anything I can produce in hard copy and consequently, I have given several different forms of output here. Hopefully, one of the forms will best show whatever is trying to be shown in the pictures.

MR. McMANUS: I would like these marked as Atkins Exhibits 3, 4, 5, 6. We will make copies of those later.

(The documents reffered to were marked as Atkins Deposition Exhibit Nos. 3, 4, 5, 6 for identification.)

MR. CONNORS: Are you going to put particular numbers? They have numbers on them.

MR. McMANUS: Yes, I'll do that for you. 3 we'll mark as picture having 20 in the upper left-hand corner. 4, on the left-hand side has a 0E about in the middle of the picture in the left-hand margin. 5, in the upper left-hand corner has the bottom of a zero.

THE WITNESS: It is the same picture without the arrow.

MR. McMANUS: And I guess the bottom of a 2.

And I've been told by Mr. Atkins it is the same as 20 but without the arrows within it.

And 6, in the upper right-hand corner has -- is that 8?

THE WITNESS: 9-C.

MR. McMANUS: 9-C.

Now, Mr. Atkins, Exhibit Number 3, Picture 20, there are some arrows drawn in. Who put those arrows on that picture?

THE WITNESS: I might say that all four of these pictures were generated from the earliest batch before I had made any measurements or anything on the pictures and were generated only to show the output quality. Basically they

are sample pictures showing how I could annotate a picture if necessary. And essentially, I put those in. This is the inter-active capability of my system. I can draw on the display. I can draw single pixels and I can color them any color I want. In this case, I have drawn white arrows indicative of what could be done to annotate an image.

BY MR. McMANUS:

Q So, those arrows have no value other than to show what can be done by your system, is that correct?

A Essentially in that picture they have no value.

Q And they're not meant to indicate tracks or anything like that in the picture, is that correct?

A No.

Q All right. Now, we are going to take a look at the first set of slides that you've produced to us and these are black and white slides taken from the set of 17 pictures, is that correct?

A No, this is taken from the initial set. This is out of the 42.

Q That's what Mr. Connors --

MR. CONNORS: For the record, the first group in the slide tray are the 42 slides originally produced to Plaintiffs' counsel and the very first portion or it, there

was some writing on the slide which I believe says CRT recording and that doesn't go all the way through to the 42, but that's in the first batch.

THE WITNESS: Well, -- essentially, some of these slides again were sample slides to show the difference between the laser scanner photographing the screen, photographing the screen with color film or black and white film, different quality type films. Again, to show the features in the best light possible.

BY MR. McMANUS:

Q Briefly, what is this first slide, the slide with the number 9 in the upper --

A Number 9 corresponds to 339 Walker and it shows the overall view of the -- of the image that I scanned not at the full revolution that I scanned it, but at a reduced revolution so I could get the entire picture on the screen. This entire negative was actually two and a quarter by three and a quarter which would extend -- let's see. It would be actually four times larger than that. So, I have reduced it to bring it up to the screen at that point.

Q So, is this slide a hard copy of the image produced by the soft copy?

A Yes.

Q With the machinery you have at your offices?

A Yes. And I think --

Q So, in other words --

A I think this is also generated with a laser. I am not really certain on this one.

Q So, in other words, you have a soft copy screen --

A Yes.

Q -- in your office and then you took a photo of that screen, is that correct?

A Essentially. I take a photo off another screen which is called a Dunn Camera which is made especially for these types of instruments. It's another high quality screen that operates in conjunction with -- on 35 mm film or on large 8 by 10 color Polaroid Film. I think this particular picture was taken, however, with a laser scanner, again, and created into a slide.

Q In your opinion, does this particular picture, the first slide Number 9 give a clear -- give clear definition than the original photographic negative that it was taken from?

A No. Very definitely not.

Q It does not?

A No. This is one quarter the revolution. One --

yeah, approximately one fourth the revolution of -- that I scanned at so that the quality of the original negative would be much better than that. Essentially what I have done here is taken the original negative and blown it up and then compressed it so I had both an enlargement and a minification of the image. And it's to show the overall scene, but you will notice there are no measurements or anything like that.

Q I understand. So in other words, this slide is no different than -- as far as quality of a picture than the -- than a hard copy picture that Mr. Macomber would have brought to you originally?

MR. CONNORS: Objection.

THE WITNESS: No. This is a lower quality because I purposely, in order to get the entire picture on the screen --

BY MR. McMANUS:

Q Okay.

A -- I have minified the picture that I had by the factor of at least four. So essentially in my minification process here I have thrown away some information even though you may not see it at this level. If I were to take that same slide, compare it with the negative under high magnification, the original negative would appear much better.

Q But if I were to put up a slide that Mr. Macomber had brought on which you based this slide that you have made, his slide would be better?

MR. CONNORS: Objection. He brought negatives.

THE WITNESS: He brought a negative.

If he were to take a positive transparency from his negative, it would be somewhat different appearing than this.

BY MR. McMANUS:

Q And which would be better in quality for being able to see what is in --

A For being able -- if you use -- at this size and this projection located where you are in the room, there's probably not very much difference.

Q Okay.

A Under magnification, the negative would definitely be better.

Q If you could just explain the significance of the --

A Okay. Basically what --

Q I see this slide also has 9 in the upper left-hand corner.

A Yeah. This is the same scene. The only difference

between the prior one and this one is now I have annotated on the display some boxes and the boxes are in subsequent frames that you are going to see the area contained within each of the boxes labeled a, b, c, d and I think they're going to be labeled 9a, 9b, 9c, 9d. It will be shown as a full slide at full revolution basically and what I've done is delineate from the north south trending walkway out to the troop compartment, an area taken in there.

Q What was the purpose of breaking down the boxes?

A Just so -- just because, again, this is at a reduced revolution from what my system is capable of, but to give an overall view of what we're looking at. Then when I go into a magnified version, we can refer back to this image and see where we are.

Q And what part does this process play in making measurements?

A Essentially, this is from the original set of data on the original set of slides which I made no measurements on. The original intent here was to show the quality of the imagery, what the various processing capabilities of my system would do and basically what we're looking at here is could I highlight several differences in the brightness basically along the path back from the troop compartment.

Q And why would you want to be highlighting --

A This is the task that I was asked to do, to see if I could establish ground disturbance along that path.

Q And do you feel that you were able to do that?

A I think so, yes.

Q And do any of the further slides show that so you can give me a better explanation or can you explain that from this slide?

A Each of the next slides will show the magnified version and I think you can see the area that we are talking about.

Q Would you put that task within the category of photo interpretation?

A In one sense, yes.

Q That involes more than a simple measurement, is that correct?

A There's no measurement involved here. Here it's just establishing where the normal texture of the ground scene, the normal texture of the fields or whatever your looking has been disturbed in a -- in a manner which is essentially manmade or something which is not natural.

Q Did you reach any conclusions about that?

A Basically I see ground disturbance the full

distance of this picture.

Q Could you point that out to me?

A In this picture here, it's basically from an area here where there's an obvious amount of debris.

Q That's in the upper right-hand quadrant of Square A --

MR. CONNORS: Left-hand.

BY MR. McMANUS:

Q I'm sorry. Left-hand quadrant, Square A.

A Extending across the upper section of A to just above the tail structure of the aircraft, extending across Box B, the small corner of Box B, and then from the lower left of Box C up to the base of the troop compartment.

Q So, it's your opinion then that there is a continuous track there, is that what you're telling me?

A There's continuous ground disturbance there, yes.

Q Was that part of your task to determine whether or not there was continuous ground disturbance?

A It was to see if I could visually highlight the subtle differences that might occur due to ground disturbance.

Q And how did you go about doing that?

A This is basically what we call contrast stretching which I described earlier.

Q But I didn't understand at that time that one of your tasks was to determine ground level or ground disturbances so if you could go through it step by step what you did to determine --

A Okay. If you go to the next slide -- from this slide would essentially set up the boxes and from the next slide we then go into the areas --

Q This is Slide 9-A?

A 9-A which shows the information that is contained in the box basically in A of 9. Again, locating from this large area of debris here and seeing the -- the definite markings along here, the vegetation disturbed, the tremendous amounts of debris, wheel -- wheel structure here, and continuing on; definitely a set of marks which essentially go from about the center of the picture toward the upper right corner of the picture.

Q Now, has this slide here been laser enhanced? 9-A?

A No. Essentially we don't laser enhance. The laser only is used as a lightbulb in exposing the film in this sense. We have contrast stretched the image in order to make the -- those areas which would tend to be similar in gray level, we've increased the contrast in that area; very

similar to turning up the contrast on a television set, changing the contrast bightness of a television set so that you can see fine details.

Q Now, in this slide, Mr. Atkins, there are some -- several lines that run almost perpendicular across the top half of the slide. Do you know what those are?

A These here?

Q Yes.

A There are some markings in the field and I would call them either drainage or irrigation or some form of a cultivated type marking in the field. Nothing, I don't believe, to do with --

Q Do you know if those are depressions or if those are small dikes or hill-type structures?

A I would have to be offering an opinion, but it's quite obvious that they're depressions.

Q And why do you say that?

A Well, noting that where some of the features -- the water basically -- you can see standing water in many areas. Not in this particular photo, but in some of the adjacent photos or some of the photos of the area you can in fact see standing water in some of those tracks that go to the end of the field as though it were an irrigation or drainage system.

Q Do any of those markings which you have characterized as being ditches appear to be broken or disturbed?

A I see disturbance across them, yes.

Q Do you have an opinion as to the cause of the disturbance?

A Well, it's in line with the troop compartment, with the position of the troop compartment across the entire image.

Q So, in your opinion, the troop compartment caused the breaks in the ditches in 9A?

A The -- yes. Something -- either the troop compartment or something attached to it or something that was going in the same direction.

Q Well, do you know what?

A You mean what actually caused it?

Q Yes.

A No.

Q Now, this is 9B.

A This is 9B which slightly overlaps with 9A and we can continue the -- eventually the ground disturbance here and, again, seeing the markings or debris scattered across a section which goes from about left center to upper right in the picture.

Q Now, it's your opinion that that is a continuous track mark, is that what you're telling me?

A Well, I don't -- if I could define it track mark. There are points that are definite appearing track marks. There are points that are gauges. There are areas which are disturbed vegetation and areas which are very heavily covered with debris, all in the same general direction.

Q Do you have an opinion as to what those marks were caused by?

A I would say that, again, it was affiliated with the troop compartment. It leads, again, right to the troop compartment.

Q 9C?

A 9C again, is a continuation with an overlap of 9B and it begins starting at the lower left of 9C going about -- going to the aft end of the troop compartment, definite grou

disturbance the whole distance.

Q And it's your opinion that that is a continuous track?

A It's continuous disturbance, yes.

Q Well, what do you mean by disturbance?

A Well, I mean that if it's either -- there's gauge marks in the same direction, there's earth or soil that has been disturbed, there is heavy debris, there is vegetation that's been disturbed along the whole distance.

Q So, is it your opinion that there is a continuous pattern of disturbances or a single continuous disturbance in the ground.

MR. CONNORS: Objection. He doesn't have to confine himself to that sort of description.

MR. McMANUS: That's my question.

THE WITNESS: I wouldn't differentiate between the two.

BY MR. McMANUS:

Q Well, is it your opinion that there is one unbroken line from -- (Pause)

What did I start to ask?

(Whereupon, the previous question was read back.)

BY MR. McMANUS:

Q -- the initial area you described in 9A through the area you described in 9B up to the troop compartment which is there pictured in 9C.

MR. CONNORS: I'll object to the form of the question because of your imposing that unbroken line definition there or category. He can answer it, if he can.

THE WITNESS: I see a continuous disturbance. I can't define a single line. A single area, yes.

BY MR. McMANUS:

Q What is depicted here in 9D?

A The area in the wing area which essentially, I did nothing with. Again, these were sample images. Many of them were sample images. At that point, I didn't know how much I was going to be doing.

Q Number 10, what is that? What does that depict?

A This is basically the same scene that is shown in 9. This is equivalent to Walker 340 photo and it's the one that's -- that I actually made measurement from based upon the troop compartment in the latest set of photos. At this point, it was just to show this particular area and the reason that Morain originally chose it and the reason that I used it was the -- the appearance path from the point

of debris in the center out to the troop compartment is nearly horizontal with the edges of the frame and therefore, would make -- would qualify as a good point for measurements.

Q This is -- the next slide is also number 10 but it has some additional squares on it. What are those squares for?

A Again, I did the same thing that I did in 9 where I have delineated -- I will delineate on the next few slides the areas designated at full revolution so we can --

Q All right. 10A. Can you describe that, please?

A That's starting at the north/south trending walkway showing the large piece of debris at that point and showing the disturbance which I indicate to be toward the right center of the photo.

Q And what did you use that photo for? That picture for?

A Essentially, again, this was to establish the disturbed area up to the troop compartment. It's very simila to 9.

Q So, this wasn't used for any measurement purposes?

A This is the one that will later be used for measurement, yes.

Q 10B?

A Again, the same continuation of the disturbed area going almost directly across the center of the frame.

Q Do you see anything else in that picture or any other area in that picture that you would refer to as a disturbed area?

A Well, the whole picture has disturbance in it in that there is debris scattered across the entire picture. At the lower left side it's the tail section of the aircraft. In the center of the previous area described, there is a set of tires and in the -- also in the very upper section there is an indication going along the same type of direction.

(Discussion off the record.)

BY MR. McMANUS:

Q Would you describe 10C?

A Yeah. 10C is very similar to 10B in that the disturbed area goes directly across the center of the photograph.

Q And it's your opinion that that's a continuous area of disturbance?

A Continuous disturbance area.

Q 10D?

A 10D shows at the lower left a disturbed area from the aft end of the troop compartment to the edge of the phot

Q Do you see any difference in the quality of what you have described as disturbed area if we go back to 10C? Does that appear to be all the same to you?

MR. CONNORS: Objection.

THE WITNESS: I don't understand the question.

BY MR. McMANUS:

Q Well, you have described a disturbed area as going across the middle of that entire slide, 10C.

A Yes.

Q Is there any difference in the quality of the disturbed area from one side to the other?

MR. CONNORS: I will object. He can't answer it if he can't --

THE WITNESS: Again, I don't know what the word quality -- I can see a disturbed area, a definite disturbed area across the entire picture.

BY MR. McMANUS:

Q Is the disturbed area on the left hand side of 10C the same as the disturbed area on the right hand side of 10C?

A They're both disturbed. However, on the left side of the picture there is more debris. There seems to be a higher -- the vegetation seems to be higher and the disturbe area has apparently wiped out the vegetation in that area.

As we go across to the center of the picture, there's been a change in the texture pattern of the surrounding land and that texture may be due to vegetation or what have you. There's a definite demarcation line running down across here (indicating) where there is a darker area of vegetation or soil or what have you on that side. There appears to be standing water in some of the marks here which I can't -- well, there's also standing water here so -- there's more standing water. There appears to be almost a continuous track from the center of the picture over. To the left, there's a continuous disturbance but I don't see the same standing water type feature. But there is a definite difference in the vegetation.

Q This is 9D and 10E.

A Okay. This is basically the same area in the compared photo 9 and photo 10 and we can identify a couple of objects here. This object is this object (indicating) --

Q You know what those are?

A No. They are obviously debris objects and at this point, they look like pieces of metal but that would only be conjecture on my part; but I can definitely, from their shap say that they are the same object and they're essentially comparable areas of the disturbance.

Q What is the purpose of these two being shown side by side?

A It's just in the particular area there are two different views of the disturbed area, to show what it might look like at different perspectives.

(Discussion off the record.)

BY MR. McMANUS:

Q Mr. Atkins, here we have a slide designated again in the upper left hand corner as 9 and this has a bluish tint to it. What does this slide depict?

A It's identical to the previous 9 except that it's taken on a different type of film.

Q Why was that done?

A Again, referring back to the -- all my work was done on a soft copy display which had higher quality than I can capture on a film. I have to present some form of hard copy output and for different types of images, different types of hard copy are applicable. At this point, I was shooting -- I was trying to find the one that presented the best visual rendition of the photos that I had worked with.

Q Is this number 9 the same as the previous number 9 that we looked at?

A Identically the same computer information in it.

Q Okay. Have you determined which hard copy form is closest to your soft copy projections?

A Neither one are very close.

Q Between the purely black and white and the blue tinted, which is the best, in your opinion?

A I think the visual system tends to like the blue - green tint to bring out smaller contrast details.

Q By the visual system, you mean the human eye?

A The human eye and it tends to be cosmetically better.

Q This is 9 with the squares designated A, B, C, D?

A Again, identically the same as the previous --

Q 9A is the same, 9B, 9C, 10?

A (Indicating in the affirmative.)

Q 10 with the squares. (Pause.)

These photos almost look like they are night time photos, don't they?

A They are a little under exposed. They tend to sho darker on your projection system than if you looked at them with a hand viewer. But they are slightly under exposed.

Q And that under exposure is because of your attempt to make them as close as possible to the soft glare? I mean the --

A No. No, it's just -- I put one setting on the camera for all the pictures. There is variation in brightness from picture to picture which I actually should go in and try to optimize the exposure for each one if I were trying to emulate what the display was doing.

Q Now, this is 9 again?

A 9, yeah, I don't think there is any -- I think it is just a duplicate.

Q Here we have 9A, B, C, D again.

A I think these may be a duplicate set.

MR. CONNORS: As I said in the beginning, there's a row of duplications in there. They were put in numerical order each time -- wait a minute. Back up. Can you back up one?

THE WITNESS: That was a new one.

BY MR. McMANUS:

Q Now, this is a picture designated as 20 in the upper left hand corner.

A Uh-huh.

Q What is that?

A That essentially is -- I think it's Walker 289.

Q What did you use that photo for?

A And essentially later on the next set I will

designate areas here and -- so that measurements -- so that you can sort of take measurements from this thing. I made no measurements on this particular image. In fact, the image itself actually continues down below what's on the screen there to the river's edge and so it shows the entire path from the river's edge out to the wings. It was put in for that purpose showing the entire area.

Q Did you use this photo to determine whether or not there was, as you have called it, a continuous area of ground disturbance?

A No.

Q Any particular reason why you didn't use it?

A Yes. One, the overall picture here is -- the negative quality is poorer than those previous pictures. Thi is taken on, I think, triax film which tends to be grainier and, the basic quality of the original picture isn't as good and the scaling is different, so -- plus the perspective.

Q All right. The next slide is designated as 748. Can you tell me what that is?

A Okay. This is out of the latest set that -- my essentially completed set which in fact you will see measurements on and the numbers in the corner represent the Walker numbers of the photos that I took excerpts from the

picture basically and this compares with the Morain photo in which he measured the tire dimension, used that tire dimension to then scale a field border dimension. In fact, I've done the same -- the same measurement here and the results show at the bottom of the slide.

Q Is a pixel always the same size?

A In relative terms, yes. In absolute terms, no. The spacing when I scanned and digitized the photographs, the pixels are always located on the original negative exactly one thousandth of an inch apart in both directions. When I convert it up to a scene like this, the actual scaling in the photographs varies depending on how far away you were when you took the photos and things like that. So, one pixel, if I were trying to equate pixels to feet, that would be a relative measurement depending upon the scale of a particular photo I was using.

Q Well, how do you determine say in this slide what a pixel in the smaller of the two photos is worth as compared to a pixel in the larger of the two?

A Well, essentially what I have done is I have taken measurements off the full revolution size of the large photo which, if I blew it up to its proper dimensions, would -- this tire that's in this box here would appear this size and

just to get it on a proper display here. Actually, I think that eight times this (indicating), so that this picture would now blow up to be eight times larger than it appears on this particular screen. I need the measurements, the actual measurements on the eight times blow up so that the number, the 2616 pixels measured from this point to this point (indicating) would be on the eight times blow up. I've then just shown an annotated version of this so that you shouldn't use this for actual measurements, but this picture you could. Now, on this picture, I knew I was given the actual tire dimension. The actual tire dimension, the diameter of the tire was given to me as 4.02 feet. I then measured how many pixels that was on the display system and by a straight calculation, I can then determine that there are so many pixels per foot. I then take the number of pixels that I have measured in the field boundary and do the straight proportion calculation and come up with the numbers shown. Now, in this case, the sixth degree that I have in there, in the Morain report, he talks about correction for perspectives and in this case, this field was not corrected for perspectives and he said that if it's less than 10 degrees out of -- in the perspective dimension, it would be a very small number for correction. I actually

measured it to be six degrees which is even smaller than he said and therefore, I did not make any corrections. My — my number stands as -- and again, it is projected off the edge of the particular image that we had available to us. I projected field boudaries in two dimensions and taking the intersection point exactly as Dr. Morain had done. Our major difference in this particular field dimension, I think, is in the tire, the absolute tire size. Dr. Morain's number was somewhat less than this, and I don't recall what it was.

Q But you both used the tire as your reference --

A We both used the tire, right. He made some other measurements based upon the height of the dike in the background based upon the dimensions of the tire which one, the task allotted to me really didn't require that; but I have put the 24 pixels beside the tire which would indicate what a 17 inch width tire would be equivalent to and you can compare that line with the height of the dike in the background where it need be. I haven't done that at this point.

Q Now, in the smaller of the two pictures on this slide, you have 67.62 pixels as the length of the tire, is that correct?

A As the diameter of the tire.

Q And as we are looking at the picture, it appears to be the length of the tire --

A Well --

Q The diameter would be the same.

A The tire is on its side.

Q And you were given that that tire is 4. --

A 4.02 feet.

Q -- 02 feet. So, if we precisely doubled the size of that picture making it twice the scale that it is now, the width of the tire in pixels then would be 67.62 times two, is that correct?

A Right.

MR. CONNORS: I am going to object to that question. Basically, there is two pictures in that last slide and I know which one you're referring to but the record is not going to be clear on that.

cd

MR. MCMANUS: Well, I said the larger of the two. You would agree that there are two pictures and one is bigger than the other?

MR. CONNORS: Yes.

WITNESS: Magnified image of the tire.

BY MR. MCMANUS:

Q. The one I was referring to when I asked the last question specifically referred to the magnified image of the tire and Mr. Atkins understood that, is that correct, sir?

A. Yes.

Q. Now, this next slide shows two designations, 267 and 269.

A. These are two separate Walker frame numbers and what I have done is take - - this is on the East side of the river showing touch down points or what has been described to me as the initial touch down point; and basically what I've done is outlined the field in the area and I then put pixel - - these are pixel measurements, not dimensions. They are pixel measurements of each of the sides - - apparent sides of the field here, the perimeter, so that I can get the permiters. I've also designated each field with a letter designation A through L, I guess, although

A, B and C don't show up on all - - the same ones show in the top and the bottom of the section. And this was basically to show that 269 was the one used for measurements in which the path of the aircraft goes almost directly across the center of the picture which would be a good place for measurements; where as in the other one, the perspective is considerably different and it shows the effect of the various measures of - - the perspective of a field. What we can assume is that these fields haven't changed their dimensions at all but yet if you try to review all of the sides in one picture to the other you'll find that there's a difference. And this is just to show the effect of the trigonometric functions that you need to operate on a picture if you are not looking along the horizontal line.

Q. Just so I am clear, and at 257 you have designated lettered fields, is that correct?

A. Yes, sir.

Q. And those match up with the same designated lettered fields as in 269?

A. Right. The field D shown here and the field D shown here are the same field.

Q. Now, in each of those pictures, pixels are the same size, is that correct?

A. Pixels are always the same size. Pixels scale is not. And that is - - in this case, we are dealing with the dimensions, the absolute dimensions which are pixel scale times perspective and this is where the variation would occur in these pictures.

Q. Do you know what the perspectives are for those two pictures?

A. I can tell that the one at the top is looking much more vertical than the one at the bottom, but because the path that we're looking for goes from the bottom corner to the top corner, the opposite top corner in 257, that's why we chose to ignore that particular picture for actual measurement and went to 269. You'll see 269 later on where I've actually referred to some measurements in that one. You will also see that this field designater, the letters show up on some of the later slides just to orient us with respect to where those things are. This was not intedded for dimensions or anything but merely to show what the effective perspective would be on those.

Q. Alright. This next slide is designated as 321.

A. This is Walker 321. It's put in only for a complete list of the Morain photos. Basically, Morain measured or stated something about the depth of the tracks in this place

and depth measurements based upon this type of imagry scaling of people are - - I just felt that I couldn't do much in that area.

Q. Slide 735.

A. Again, the letter designators refer back to the previous slide, the same field so that we can see where things are happening and you can see touch down - - at least touch points for the aircraft in the field; and again, I didn't make any measurements. It's just to designate the - -

Q. Are those letters to designate the same fields that were indicated on 259 - - 257 and 269?

A. Yes.

Q. 736.

A. The same type of field designator only this shows down the track slightly and shows at the junction of two other fields; and again, no measurements were made on that. It just designates the particular fields.

Q. Now, this is 269 again.

A. This is 269, only this time I have taken the dimension. I have - - again, it shows the field designation but the measurements from 748 is shown at the far right. It's the same field boundary that is measured in 748 and it

just shows it as scaled on this particular photo.

Q. Now, how did you determine the feet? Again, that was from 748 using the tire?

A. That was from 748 using the tire. This will be used again in the next set.

Q. 340. Slide 340.

A. Now we go to the West bank and this is what I base the measurements on the West bank on, this particular photo. It's Walker 340 and it measures - - it basically - - what shows in the photograph there are some arrows and lines and degrees showing the troop compartment and a three degree indication. The three degrees is not to say that the path is off three degrees from the glide path or anything like that. That three degrees is reference to the display coordinate system to show that the perspective correction doesn't have to be done basically here. The - - I measured the total -- the distance from one end of the troop compartment to the other, determined that to be so many pixels, equated that to the number of feet that was given to me, then measured the pixel length from the north south trending walkway to the forward end of the troop compartment and calculated what the total length of that would be. I also verified in this particular image the perspective and

the measurement of the tail. I didn't - - I took the troop compartment measurement. I used the irrigation or drainage canals in the field just above the tail section to establish what the perspective would be. In fact, I measured the distance between these points assuming - - the one assumption I made was that those lines were parallel. If they're parallel, then I can, in effect, establish what the perspective would be as I went up in that direction. I then took the same height in the image as the troop compartment, made a measurement on those irrigation or trenches at that point, made another measurement down here at this height, determined what the difference was that the dimension of the tail out of it and I then re-calculated what the total length of the field would be and I came within five feet I believe of that overall 790 foot dimension. So, I - - to my satisfaction, I verified the length that we are using.

Q. Now, your reference point again was the troop compartment, is that correct? That's what you used as your - -

A. I used that as the absolute scale.

Q. Now, we have these slides 340A, B, C, and D. Would you explain those?

A. Okay. This essentially is in pixels. All dimen-

sions are in pixels and shows identically the same - - it's a blow-up of the area contained in 340 on the previous slide.

Q. This slide is designated as 262 and 259.

A. Alright. I've taken a section out of both images and this is where I transform certain objects or locations in the particular scene so that I can relate them to scale then to dimensions later on. Basically, what I have done is these two pictures were taken almost at 90 degree angles. 262 is what we are actually going to use to make our overall measurement from the river bank to the troop compartment and I used the entire 262. This only shows a segment of it. What I have done is I designated area - - points in 262 which I can also see in 259 and essentially their field boundaries in this case. I've designated the same points and now we can essentially - - I would use this in the set of slides to relate the perspectives and the measurements.

Q. This next slide, number 259.

A. This is the total 259 showing the troop compartment up at the end. It shows a little bit more than the previous 259.

Q. What is the purpose of the markings on this slide and the previous one?

A. It's, again, to show - - we'll be able to show where various things have occured in the image. I will be able to give you dimensions from each one of these points based upon scaling of another photograph.

Q. What items were you asked to give distances for?

A. The river bank to the troop compartment.

Q. Well, you said you could use those in describing where things occured. What things are you referring to?

A. Well, where any objects are located along the path, where fields go, if you can find a particular object in a track and want to know how far it is from the river bank say you should be able to go in here, locate it on here and be able to come up with the dimensions.

Q. The next slide is designated as 262.

A. Okay. This is the one - - the 262 is the one we actually used for the overall river bank to the troop carrier dimension scaling and again, I have shown the same designated points as in the previous slides.

And now what I have done is from point - - the north south trending walkway to point M which is the forward end of the troop carrier, I know the absolute dimension of that from photo 340, okay; and that's from this area here up to here. I know that to be 790.2 feet measured

on photo 340. I then go in because all of these other points are on the horizontal line in the same direction as that, I have proportioned and measured the number of pixels between each one of those points and I have given you the number of pixels that I have measured and I have converted it into feet using the 790.2 dimension. And so you can determine between any of the field boundaries or any of the objects that I have designated on this particular scene you can determine what the overall dimensions are.

Q. We have skipped a couple. Number 767. Does that have any particular significance in your - -

A. This one and the two previous ones - -

Q. - - calculations?

A. - - both have - - not in calculations, but I can refer the same designated points that I made measurements to so you can now go in and on this particular photo establish the relative measurements of different objects if you need to.

Q. You have a series here of slides, 340, 340A, B, etc. What were these used for?

A. This is part of the same measurements. This is where I actually got the measurement for the distance from the north south trending walkway to the troop compartment.

Q. I don't see any designations on them.

A. No, but they are the images that I used and again, this is a copy of the - - from the original 42 set showing the disturbed area on the ground with no measurements; just showing the area. It's basically a duplicate.

Q. The next slide is marked 300.

A. Again, no measurements were made on this.

Q. 83. Slide 83. There is no significance to that?

A. It's just - - I put in the complete Morain images as they would appear out of the system basically.

Q. Slide 757.

A. No measurements were made on it. Again, just to show the quality.

Q. 187.

A. Morain made in - - actually tried to determine the diameter of the aft end of the troop compartment from this photo. It's just - - I was given that dimension basically so I made no measurements.

Again, no measurements; just looking, digitizing and scanning the image to give you the feel for quality.

Q. But this slide was digitized and scanned?

A. All the ones you have seen here have been digitized and scanned.

Q. This one has no number, but it's - -

MR. CONNORS: Yes, it does.

WITNESS: 762.

BY MR. MCMANUS:

Q. Where do you see that? Oh, I see. It does have 762 very, very faintly in the upper left hand corner. It is a picture of two wheels in the foreground and the troop compartment straight back from that about 3/4's the way up the photo, the flightdeck off to the left.

761. Does that have any significance to your measurements?

A. No. It is again another Morain photo.

MR CONNORS: For the record, the next group of slides will be a duplicate of those photographs with color film, but there are two additions in there which correspond to those two blanks we saw earlier and they're new slides.

MR. MCMANUS: We will get to that. Let me make copies of these. We're almost done.

(Pause)

Now, again, Mr. Atkins, these are the same slides we have just seen but these have been printed in color, is that correct?

WITNESS: No. The previous ones were exposed on

black and white film. These were exposed on color film.

BY MR. MCMANUS:

Q. And that's the only difference?

A. That's the only difference, yes.

Q. And that, again, was part of your effort to try and get as close to the soft prints as you could?

A. Yeah, I tried; yes.

Q. Well, I'm just going to go through these and could you stop me when I reach the two we haven't seen before?

A. Okay.

(Pause)

That one - - I'm sorry. You saw the top half of this before, but now the difference is here there is two other dimensions that I put on and I've proportioned those dimensions from 748 which is the field boundary at that point and established the point which I think is to be the break in this field boundary and then the break in the other field boundary and it is just to give an overall view of the distances we're talking about here.

Q. This slide is, again, 269?

A. This one.

Q. Alright. This slide is number 262?

A. And essentially what I have done is taken the information off the previous slides and just put it down to a couple of simple dimensions. I think that the dimensions I have here correspond exactly to where Morain's measurements occured; from the initial - - the river bank to the dike, the dike to the aft end of the troop compartment, and from the north south trending walkway to the aft end of the troop compartment.

Q. Alright. So, it's your opinion that both you and Dr. Morain have measured from point A to - - is that N?

A. M.

Q. M. And that you've both measured from the river bank which is a bit before point A.

A. I am not certain that he measured the river bank to point A.

Q. Alright. Now, how about from - - there's no designation, but I guess you've been calling it the walkway, the beginning of your 715 feet. Is it your opinion that you and Dr. Morain measured from the point at the beginning of the walkway to your point F?

A. Yeah, I think we both have that same picture.

Q. Alright. Mr. Atkins, we have had copies made of the notes and some photos in your file.

(Discussion off the record)

BY MR. MCMANUS:

Q. Now, I'd like to divide what we have copied into two catagories. First, we'll mark as Atkins Exhibit 7 the 23 pages of notes and notepaper, xeroxes of pictures that came from your file and then as Atkins Exhibit 8 the xerox copies we have made of the 17 photos that you've picked out for me as being those that were given to you by Haight, Gardner and from which you have made your project.

(The documents referred to were marked as Atkins Exhibit 7 and Atkins Exhibit 8 for identification.)

BY MR. MCMANUS:

Q. I would appreciate it if you could quickly go through the Atkins No. 7. In other words, the paper notes that you have and identify those, what they are.

A. Page 7?

Q. No, Atkins Exhibit No. 7.

A. Oh, okay. The whole thing.

Page 1 is the same information that's located on one of these photos - - one of these slides we just saw and this was only in case I had to reference it. I didn't have

a copy of the photo.

The next several pages are a description of the C4500 Colormation Mark II optronic scanner that I used to digitize and imagry and the specifications of it.

Then in the next page, shows the coordinate systems of some of the images that I am working with.

The coordinates based upon where they are located on the -- for my reference purposes, where they're located on the computer. There's also some verification of the calculations that the computer essentially made which I took the thing and I just hand calculated them.

The next two pages basically are just -- refer to the particular Walker numbers of imagery and I have just notes on the measurements that I actually made. All of the information is contained in the photographs -- in the slides basically now. This was again, for transfer to my notes rather than keep them on the photographs.

The next page again, is some shorthand describing my -- the way the images are basically catalogued in the computer and how I refer to them. It's a bookkeepping type of thing.

The next thing is a correlation of Morain number and Walker number against the particular images that I used and the only difference between my images and the Morain images, I used one more image -- no, I didn't. I originally had used one additional image that he didn't use, 252, but I made no measurement. I made some initial measurements, but haven't been presented here, I don't believe.

The next page, this is a complete list of all

of the negatives that I had at any time. The negative numbers in the first column basically, and the comparative -- the comparable Walker numbers in the second column, just, again, for bookkeepping purposes.

Then there is nine pages of photocopies of -- again, a correlation between Morain pictures and Walker pictures being numbered; and again, for reference purposes, to keep track of where everything was.

And then at the end, a set of photographs which --

MR. CONNORS: Just a minute. Atkins 7 --

THE WITNESS: Oh, there's two. Okay.

BY MR. McMANUS:

Q Now Atkins 8.

A Atkins 8 is a set of photographs.

Q And I believe there are 18 there. I might have said 17 before. The top one is one from the original 12 and I believe the next 17 are the 17 we referred to.

A These essentially, are the 17 corresponding to the Morain used pictures plus Walker's 339 and these were taken from the original negative. There are photographic reproductions from the original negatives. Again, for reference purposes.

(Discussion off the record.)

BY MR. McMANUS:

Q All right. Mr. Atkins, are you aware that the Government yesterday produced additional aerial photographs?

A I have been told that, yes.

Q Have you seen them yet?

A I haven't seen the original photographs, no.

Q Have you seen copies of them?

A I saw a xerox, a very poor quality xerox copy.

Q Did you use that in any way to make comparisons wit any of the photos that you have used or any of the measuremen that you have made?

A Basically, no. Just visually looked at them. They are vertical shots.

Q Would those make it easier to measure?

A If they are of a sufficient quality and I couldn't tell from the xeroxed copies.

Q Do you have plans to look at the originals that have been produced by the Government and --

A At this point, I am not under contract to do that.

Q I presume you are getting paid for your services?

A Yes.

Q At what rate?

A It's a contract with ITEK. It's a time and

materials contract. I believe it's $123 an hour.

Q And that's what Lockheed pays ITEK?

A That's -- well, we are under contract to Haight, Gardner and that's what --

Q Somebody pays ITEK $123 an hour for your services and the materials that you use?

A Yeah, my services and any of my support services.

Q Is that a straight hourly rate?

A That's a straight -- the way the contract is, it's a time and materials contract.

Q So, for the time that it took for you to fly down to Washington from Massachusetts, that's also $123 an hour?

A No.

Q No?

A No. Our time and material would not normally be based -- unless under absolutely some other type of conditions being the level engineer that I am, trips are normally not paid for by the company other than expenses so that there would be no overtime pay or anything like that. It would be a straight eight hour type day in general.

Q Well, I presume you left Massachusetts this morning?

A No, last night.

Q Last night? You are getting paid for being here today, is that correct?

A Yes.

Q And for billing purposes, what time did your day start today?

A Eight o'clock.

Q Eight o'clock in the morning?

A It would be an eight hour day.

Q Regardless if you don't get back to Massachusetts until ten o'clock tonight, it will still be billed an eight hour day?

A I think it will be billed as an eight hour day. Yes.

Q Do you know Mr. Welsh?

A I don't really know him. I have met him.

Q Was that in conjunction with this project?

A I originally -- because I have the original negatives of these -- of some of these original negatives, I made copies in my photo lab which I sent down here and I sent one copy to him. That's where I first heard the name and then last night in their office I met him basically. But, we essentially have no dealings of a technical nature.

Q So, you didn't work together --

A. We have not worked together.

Q. -- on the project.

Have you been asked to be available to give testimony in the trial of this case that's coming up?

A. Unofficially, yes, I guess.

Q. Since Mr. Macomber gave you his description of the crash, have you been given any other facts as to how the crash occurred or what happened?

A. Well, I have talked with Mr. Connors.

Q. What facts has he given you?

A. I think he may have corrected one or two of the things that Mr. Macomber had said and I'm not certain that there was any additional facts.

Q. What were the facts that he corrected?

A. I think the distance to the airport or distance from Saigon airport or something like that. Originally, I remembered it something longer than a couple of miles.

MR. CONNORS: I also corrected the altitude from approximately 23,000 to 4 -- 24,000 feet.

BY MR. McMANUS:

Q. Have you disclosed to me today, all of the tasks that you have been asked to do in conjunction with this photographic project that you have been working on for

Lockheed?

A I believe so, yes.

Q And as far as you are concerned at this point, you have done all of your work and we've discussed that here today?

A Yes.

MR. McMANUS: Thank you. I have no further questions.

MR. CONNORS: I have just a couple.

MR. McMANUS: Are you serious?

MR. CONNORS: Uh-huh.

(Discussion off the record.)

EXAMINATION BY COUNSEL FOR THE DEFENDANT:

BY MR. CONNORS:

Q I just want to clarify a couple of points, Mr. Atkins. Mr. McManus asked you several questions, many questions in fact, about the degree of any enhancement of these photographs. Are there a variety of types of enhancements that a firm such as ITEK or persons such as you could perform on these photographs?

A Photographs in general, yes.

Q Imagery in general?

A Imagery in general, there is a whole other class of

enhancements, restoration techniques utilized on photographs which basically are forte transform filtering operations which can do edge sharpening, can extract additional information from pictures. Those particular types of enhancements or processing tend to change the information contained in the image in some manner and in general, they had -- in general, they add artifacts, what we call artifacts to the image. They may cause ringing around edges of an object. They may set up a striation pattern or some form of texture pattern in the image which for certain purposes, makes it easier to extract intelligence from it; but for other type purposes could be misconstrued if you are not careful. None of that type of imagery has been processed in the system, presented in this particular type of imagery. Basically, this type of imagery is fairly high quality compared with what I would normally work with and the -- normally, we are given much lower resolution, much fuzzier pictures taken in haste, under more adverse conditions and ask to try to extract additional information from it; and these particular images are fairly high quality to begin with and I think the mensuration capability is the prime use in my particular system in this case.

Q Have you done anything to any of these materials

which you have compared which put something into the picture which is not already there?

A To the best of my knowledge, no.

Q Have you done anything to any of these pictures or slides which have subtracted anything or suppressed anything that was in one of the pictures?

A I will take back what I've said on the previous one. There is annotation and all obviously on the pictures which weren't in the originals. They're all my additions. As far as the imagery data, again, to the best of my ability, we have not -- we may have suppressed or visually optimized some of the information that was contained in the original, but we haven't altered the original data in any way.

Q You referred specifically to a contrast stretch, is that correct?

A Yes.

Q Does that change in the form of adding or subtracting any physical features to the picture or slide in which we have used here today?

A No, essentially no. It allows you to see features which are of very low contrast in the original image and essentially, it's equivalent to turning the brightness

contrast knob on a television set, going from a picture which is very light colored, hazy across the entire picture to one that has very high contrast; but you are essentially not adding any new information to the picture.

Q Did, at any time, we ask you to do any alterations in the form that you outlined before, the forte, edge enhancements or that sort of thing to any of this material?

A The original -- when Mr. Macomber originally came in, he asked me to look at the imagery and tell him and show him what I basically could do in terms of enhancement of that type. I deemed at that point that because of the quality of the imagery, that it probably wouldn't bias very much and it basically would be -- he wouldn't have enough knowledge of what you had added or what you subtracted to be able to testify to that extent.

Q Okay. And you are confident, to the best of your professional standards that these materials have not been altered in that fashion, is that correct?

A Yes.

MR. CONNORS: Okay. That's all I have.

MR. McMANUS: Thank you. Thank you.

(Whereupon, at 4:37 o'clock p.m., the taking of the instant deposition ceased.)

I have read the foregoing pages to the deposition which contain my answer to the questions asked therein and find them to be true and correct.

_____
Signature of Witness

SUBSCRIBED AND SWORN to before me this _____ day of _____, 1982.

_____
Notary Public

My commission expires: _____.

CERTIFICATE OF NOTARY PUBLIC

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF ARLINGTON)

I, CLAIREEN M. HOLMES, the officer before whom the foregoing deposition was taken, do hereby certify that ARLAND A. ATKINS, whose testimony appears in the foregoing deposition was duly sworn by me, a Notary Public in and for the Commonwealth of Virginia at Large; that the testimony of said witness was recorded by me by stenotype and thereafter reduced to typewritten form under my direction; that said deposition is a true record of the testimony given by said witness; that I am neither counsel for, related to, nor employed by any of the parties to the action in which this deposition was taken; and, further, that I am not a relative of or employee of any attorney or counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of the action.

Notary Public in and for the
Commonwealth of Virginia at Large

My commission expires: February 8, 1985.