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IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF COLUMBIA

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4 FRIENDS FOR ALL CHILDREN, INC., :  
5 as legal guardian and next friend :  
of the named 150 infant individuals, :  
et al., :  
6 :  
7 Plaintiffs, :  
8 - vs - : Civil Action  
9 LOCKHEED AIRCRAFT CORPORATION, : No. 76-0544  
10 :  
11 Defendant and Third- :  
12 Party Plaintiff, :  
13 - vs - :  
14 THE UNITED STATES OF AMERICA, :  
15 :  
16 Third-Party Defendant. :  
17 ----- -x  
18 Arlington, Virginia  
19 Friday, January 8, 1982

20  
21  
22  
23  
Deposition of DR. ROBIN I. WELCH, the witness  
herein, called for examination by counsel for the  
Plaintiffs in the above-entitled action, pursuant to notice,  
the witness being duly sworn by MAIRIM B. KENNELLY, a  
Notary Public in and for the Commonwealth of Virginia at  
Large, at the offices of Lewis, Wilson, Lewis & Jones,  
2054 N. 14th Street, Arlington, Virginia, commencing at

1 1:15 o'clock p.m., the proceedings being taken down by  
2 stenotype by MARIM B. KENNELLY, and transcribed under her  
3 direction.

4 - - -

5 APPEARANCES:

6 On behalf of the Plaintiffs:

7 MICHAEL J. MC MANUS, ESQUIRE  
8 Lewis, Wilson, Lewis & Jones  
9 2054 N. 14th Street  
Arlington, Virginia

10 On behalf of the Defendant Lockheed:

11 JOHN J. CONNORS, ESQUIRE  
12 Haight, Gardner, Poor & Havens  
13 1819 H Street, N. W.  
Washington, D. C. 20006

## CONTENTS

Examination by Counsel  
For Plaintiff For Defendant

## **EXHIBITS**

<u>Deposition</u>	<u>For Identification</u>
Exhibit No. 1 (Doctor's handwritten notes)	131
Exhibit No. 2 (Doctor's report)	131

1  
2  
3  
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P R O C E E D I N G S

Whereupon,

ROBIN I. WELCH,

a witness herein, called for examination by counsel for the Plaintiffs, having been first duly sworn by the Notary Public, was examined and testified as follows:

EXAMINATION BY COUNSEL FOR THE PLAINTIFFS

BY MR. MC MANUS:

Q. Could you state your name, sir?

A. Robin I. Welch.

Q. And do you have a business address?

A. Yes. It's 1111 Lockheed Way, Sunnyvale, California, 94086.

Q. And by whom are you currently employed, sir?

A. By Lockheed Missiles and Space Company, Lockheed Missile and Space Company.

Q. And, are they an affiliate or branch of Lockheed Aircraft Corporation?

A. Yes.

Q. Could you give me a brief resume' of your academic training, starting with your undergraduate college degree.

A. I went to the University of California at

1      Berkeley where I got a degree in Forestry in 1955,  
2      Bachelor's of Science and then proceeded for a Master's  
3      Degree in Forestry, completed in 1956; and then took a  
4      number of years to obtain a Ph.D. which I finished in  
5      1971 from the University of California at Berkeley in  
6      what's called Wild Land Resource Science, given by the  
7      School of Forestry at Berkeley.

8      Q.    When you were getting your Bachelor's and and  
9      Master's Degrees, in Forestry, did that entail in any way  
10     the study of geography?

11     A.    Yes.

12     Q.    Could you give me a synopsis of the types of  
13     courses that you took that might have related to geography  
14     or studies that you might have made?

15     A.    Those would have been primarily involved with  
16     natural resource relationships in geography fields: forests,  
17     range lands, soils, water, wild life, and the interaction of  
18     man in timber management, commercial production of forest  
19     products -- so, as such, there was some involvement with  
20     geography with a geographic science meaning earth resources.

21     Q.    How detailed were your studies about soil types,  
22     vegetation types, things of that nature?

23     A.    Well, they were standard courses given by the

1 school which are required by all students. My emphasis was  
2 primarily in the vegetation sciences, and as a part of that,  
3 I had to take the Soil Science course and Forest Influences  
4 course which included soils, vegetation, water relationships  
5 -- silviculture, it's called. S-i-l-v-i culture. That's  
6 one word.

7 Q. Now, you said these were courses taken by all  
8 students; do you mean all forestry students or all students  
9 at Berkeley?

10 A. All students in the forestry program.

11 Q. And about how many of these courses -- I am not  
12 asking you to precisely recall at this point, but about how  
13 many courses would you have taken that relate to the  
14 geographical matters that you have just described to me?

15 A. Perhaps six of them would have touched on  
16 geography. None of them were given by the Geography  
17 Department, however, they were given by the Forestry  
18 Department, the ones that I took. Although, people could  
19 have taken qualifying courses by other departments which  
20 could have included geography and passed the same requirement  
21 for the degree program.

22 Q. And your precise degrees were in forestry; is  
23 that correct?

1 A. Yes.

2 Q. Would you just give me a summary of what that  
3 includes; how would you describe forestry to a lay person?

4 A. Forestry is the growing of trees and managing  
5 of forest lands for resource production and that includes  
6 timber, forage, grazing lands, water shed management, wild  
7 life management, recreation and urban sciences that may  
8 relate to it such as highways, utilities, transportation of  
9 water generation, hydroelectric power -- that sort of thing.  
10 The management of those resources is for, usually,  
11 commercial purposes, frequently recreational purposes.

12 Q. Now, you obtained your Ph.D. in Wild Land  
13 Resource Science; is that correct, sir?

14 A. Yes.

15 Q. Could you describe what that entails?

16 A. It's a more general approach to the wild lands  
17 than forestry. Forestry would be specifically aimed at  
18 growing trees and producing sawed logs or timber, Wild Land  
19 Resource Management includes a water aspect of wild land's  
20 management. Instead of just forestry, it includes water  
21 shed management, wild life production, water production from  
22 the lands, range land management and the soil and water  
23 conservation that may relate to it. It's a more general

1 degree and my specific interests were Remote Sensing or  
2 data collection interpretation, photo interpretation, by  
3 aerial and space photographs.

4 Q. And how did you tie in the Remote Sensing and  
5 use of aerial space photography with wild land resources?

6 A. Perhaps one of the earliest uses of aerial  
7 photography was for civil purposes, was by the forest  
8 industry. Forest lands, as such, are somewhat difficult to  
9 get into and inventory because they are rugged, there's  
10 a lot of trees in the way of seeing the forest; you can't  
11 see the trees for the forest -- so, aerial photography  
12 became a reasonable way to inventory and manage forest  
13 lands and, as such, a forestry student is required to take  
14 some photo interpretation. My interests tend to focus on  
15 photo interpretation and the observation of the forest and  
16 wild lands from the view from above or the remote view, as  
17 it were; and, therefore, I specialize in Remote Sensing data  
18 collection and interpretation and the analysis for resource  
19 management of those data. And during my career -- during  
20 my schooling, the space program was just getting started;  
21 and, at that time, anyone that had the expertise and interest  
22 in Remote Sensing exposure to the space program and usually,  
23 were employed either part time graduate student or full time

1 in the field of supporting the space program in Remote  
2 Sensing and reconnaissance.

3 Q. Now, what courses did you take in your studies  
4 of Remote Sensing data collection and photo interpretation?

5 A. I took a standard photogrammetry course that  
6 was given by the School of Forestry and then several  
7 special graduate level courses for those students that were  
8 interested in the photo interpretation, photogrammetry  
9 aspect. The difference between those two being photo-  
10 grammetry, as such, means photo measurements, measurements  
11 of distances, heights, counting of features and photo  
12 interpretation means more specifically analysis and inter-  
13 relationships of the features that may be seen on the  
14 photography which may or may not include measurements of  
15 them. The two go hand in hand.

16 Q. Do you, Doctor, consider yourself a photo-  
17 grammetrist?

18 A. Not as such, if you would consider that a  
19 map maker where that involves the use of precise plotting  
20 instruments, photogrammetric devices, for map making and  
21 cartography; my expertise has been in photo interpretation,  
22 as I say, the two go hand in hand, so we have to understand  
23 the aspects of photogrammetry.

1 Q. Is that a society or organization of photo  
2 interpreters, a national organization?

3 A. It's a branch of the American Society of Photo-  
4 grammetry, and it's the photo interpretation section of it.  
5 In fact, there are probably a half dozen sections in that  
6 which include Remote Sensing, data collection, cartography,  
7 and so forth that are all under the umbrella of the American  
8 Society of Photogrammetry.

9 Q. Are you a member of the American Society of  
10 Photogrammetry?

11 A. Yes.

12 Q. And how long have you been a member?

13 A. Since about 1956.

14 Q. During your studies leading up to your Ph.D.,  
15 what practical experience or projects did you work on in  
16 addition to the courses that you have already told me about,  
17 in the areas of Remote Sensing, data collection, and  
18 photo interpretation?

19 A. Well, while I was still a student?

20 Q. Yes. Well, anything that might have contributed  
21 to your education and to your obtaining your Ph.D.

22 A. I was involved in one of the first studies of  
23 the use of color photography for natural resource inventory.

1 The color film had been developed during World War II by  
2 the military for their survey work including what is called  
3 camouflage detection film, or color infrared film, and  
4 these films were quite new to the civil industry after  
5 World War II; and then in starting in 1949, when I went  
6 to Berkeley, we began to investigate the applications of  
7 these color films to civil applications which included  
8 forestry, agriculture, soil surveys, water management, a  
9 few military courses or military questions which are not --  
10 I am not at liberty to discuss, but related to the use of  
11 these special films and that included multiband black and  
12 white photography, taking the same bands in the color film,  
13 only doing them one band at a time on black and white film  
14 with narrow band filters; and then through these investiga-  
15 tions, I was able to satisfy, in part, the requirements for  
16 my Ph.D. research program. My emphasis, later on, became  
17 -- I was involved in agriculture, inventory and crop  
18 analysis, including yield estimation, coastal zone survey  
19 work which included sand, gravels, silt, estimations of the  
20 vegetations that cover those areas, which involved some  
21 wet land investigations; and again, the development of  
22 specifications for the survey work using special film and  
23 filters.

1 Q. I noticed that your Ph.D. came approximately  
2 fifteen years after your Master's did. Is there any  
3 particular reason for that?

4 A. The Ph.D. program was not available at -- when  
5 I got my Master's Degree in 1956 in Forestry in Berkaley.  
6 I did continue school through 1958 toward a program that  
7 might lead to a Ph.D. and then in -- then I dropped out of  
8 school, and in 1960 the program -- '60 or '61, was finally  
9 created for a Ph.D. in Forestry at Berkeley, and I went back  
10 to school; and I had already started work, so I was part  
11 time school and part time work. In fact, full time work  
12 for awhile, and my schooling was stretched out over a number  
13 of years; but I was only out of school for a period of  
14 maybe five years. And then I went back in from '64, '63 or  
15 '64, continuously until '71 when I got my Degree.

16 Q. I presume that you have to write a thesis to  
17 obtain your Doctor's Degree?

18 A. Yes.

19 Q. What was the subject of that?

20 A. The subject was the use of aerial photography  
21 for water resource management.

22 Q. Generally, what was the thrust of that thesis?

23 A. That was developing specifications for the use

1 of aerial and space photography for the water resource  
2 applications which included inventory, vegetation analysis,  
3 related to the water shed management in broad fields of  
4 science, agriculture, forestry, coastal zone management,  
5 marine studies; so, it was primarily developing a specifica-  
6 tion and interpretation technique using these special films  
7 and a space program was emerging; and it was during the time  
8 I got my Ph.D.

9 Q. Now, for example, within the ambit of your  
10 thesis, did that include looking at photographs and trying  
11 to determine how an otherwise arid zone could be irrigated  
12 or a flood zone could be made to no longer be a flood zone  
13 by changing the course of water resources?

14 A. From the aspect of data collection and data  
15 analysis, yes. In other words, it was not a management  
16 program to find these areas and then make a proposal as to  
17 how to do it, what you are talking about; but for the  
18 data collection involved in inventorying, measuring, count-  
19 ing, estimating, the conditions that existed, yes. It  
20 involved both arid lands and wet lands. Wet land acclima-  
21 tion and what's called new lands agriculture, finding new  
22 areas for agriculture to be --

23 Q. Do you still have copies of that thesis?

1 A. Yes.

2 MR. MC MANUS: I'd ask for a copy of Dr. Welch's  
3 doctoral theses be provided to us.

4 BY MR. MC MANUS:

5 Q. Did you have to write any sort of theses for  
6 your Master's Degree?

7 A. Yes. My Master's Degree involved the collection  
8 of data -- it has been so long now, I don't remember the  
9 details of that one.

10 Q. Do you still have a copy of that around?

11 A. The best place to get a copy of that would be  
12 the Manual of Photo Interpretation; it was extracted and  
13 used in a chapter on Management and Photo Interpretation,  
14 on the Acquisition of Photography, which is a publication,  
15 a text book type publication, by the American Society of  
16 Photogrammetry.

17 Q. The precise title of the publication is --

18 A. Manual of Photo Interpretation and chapter on  
19 Photo Acquisition. I was a contributor to that, and my  
20 thesis was used primarily in that document.

21 Q. Are you saying your entire Master's thesis was  
22 incorporated into that chapter or that that was drawn from  
23 your Master's thesis?

1 A. I was a contributing author to that.

2 Q. Okay. Do you recall who were the other  
3 contributing authors?

4 A. Robert Cowell, C-o-w-e-l-l, was the primary  
5 author.

6 Q. Is he the primary author of the entire manual or  
7 just the Photo Acquisition chapter?

8 A. Both.

9 Q. Okay. Now, you mentioned that during the course  
10 of your studies towards your Ph.D. some of the projects  
11 you worked on you are not at liberty to discuss; is that  
12 correct? Were they for the United States Government?

13 A. Yes.

14 Q. I wanted you to understand I am not trying to  
15 get you to say something that perhaps -- or you have taken  
16 an oath not to divulge or something like that. I just want  
17 the general background; was it for the Defense Department,  
18 the Agricultural Department --

19 A. Corp of Engineers, Army.

20 Q. Corp of Engineers, and can you tell me the  
21 period of time in which you worked on these government  
22 projects?

23 A. 1955 to about '61, I guess, was the time frame.

1 analysis, developing specifications for their military  
2 survey work which included the wet lands type environment,  
3 sand, gravel, and the vegetation indicators for soil and,  
4 of course, the military aspects of that became classified.

5 Q. Was that a world-wide type project or was it  
6 restricted to the United States or, if not to the United  
7 States, where else?

8 A. The survey sites were in the United States. I  
9 don't know whether the data might have been used in their  
10 global operations, but the test sites that we used were in  
11 the United States.

12 Q. And did you actually take aerial photographs  
13 during this project yourself?

14 A. Yes.

15 Q. And then, I presume, that you interpreted them?

16 A. Yes.

17 Q. Did you ever then correlate your interpretation  
18 with actual on-the-ground studies?

19 A. Yes.

20 Q. Doctor, I notice from your CV that's been  
21 provided to us that since 1956 until the present, you are --  
22 or you are President of Air View Specialists Corporation.  
23 Would you give me a little bit more of a description of the

1 general business of Air View Specialists Corporation?

2 A. When I was in graduate school, I was involved in  
3 projects that required renting an airplane and taking aerial  
4 photography for some of the research work which we were  
5 doing there at the University.

6 Q. Did you say renting or running?

7 A. Renting an airplane and subsequently the --  
8 my experience in that permitted me to bid on some work that  
9 related, again, to the work I was doing at the University  
10 as well as my own personal interests, and I formed a  
11 partnership at that time in 1955, for a couple of years,  
12 '55 and then later '56, we incorporated it as a small  
13 corporation. We operated the Corporation then for about  
14 ten years at which time I bought out the partners and kept  
15 the Corporation for my own personal Corporation as it has  
16 been since then. My wife and I are full owners of the  
17 Corporation.

18 Q. Who were the other founders of the Company?

19 A. A fellow named David Doyle, who works here in  
20 Washington, D. C.; Phillip Langley, who works in Walnut  
21 Creek, California, were the other two founders of the  
22 Corporation.

23 Q. What is the primary business of the Corporation?

1 Q. And, was all of your work classified or part of  
2 it --

3 A. Part of it was.

4 Q. Part of it. The parts that weren't classified,  
5 can you tell me what that was all about?

6 A. During what period?

7 Q. Any time that you have worked for a government  
8 agency.

9 A. Well, most of my unclassified work was for  
10 NASA in earth resources survey developing specifications for  
11 the hardware, the cameras, that were put on satellites or  
12 the various earth resources survey work, agriculture,  
13 forestry range --

14 Q. That was in the '70's; isn't that correct?

15 A. Yes. All those -- we were doing preliminary  
16 work even in the '60's, towards that.

17 Q. All right. Really focus then on the period of  
18 1955 to 1961, the Corp of Engineers. You said some of the  
19 work wasn't classified. What were you doing for the Corp  
20 of Engineers that wasn't classified, if you can tell us about  
21 them?

22 A. I can give you a generic discussion of what that  
23 was. It was primarily involved in vegetation and soils

1           A. Aerial survey services, photo interpretation --  
2           for awhile it involved taking aerial photography. Two years  
3           ago I sold the airplane and have been -- not been taking my  
4           own aerial photos then but have been using aerial photos  
5           provided by NASA in this case or commercial sources; and  
6           as you notice, I have been employed by other employers and  
7           would use the Corporation as a way to get aerial photography  
8           through my own operation with the airplane that I owned.

9           Q. How much of the Corporation's business is with  
10           the government?

11           A. During the last four years, it was a hundred  
12           percent with the government. When I was a NASA employee --  
13           excuse me, a NASA contractor, and I had the contract under  
14           my own Corporation; and prior to that, it was varying from  
15           ten to fifty percent would be government work and at least  
16           federal government work. And there were also state govern-  
17           ments, local governments, engineering companies, private  
18           industries of various kinds, could employ me for services;  
19           and during the last four years, as I said, from 1977 to '81,  
20           I had a NASA contract with Air View Specialists Corporation.

21           Q. What kind of projects would commercial companies  
22           ask you to do?

23           A. Photo interpretation of such things as coastal

1 zone surveys to show the effects of cutfalls from industrial  
2 sources, heated waters, chemical discharge, investigations of  
3 agriculture production for a particular customer such as  
4 perhaps the Grape Growing Organization, Grape Institute for  
5 agricultural survey work, some range land management for  
6 companies that would be involved in running livestock --  
7 things such as that.

8 Q. Had you ever done any work either directly or  
9 indirectly for Lockheed or any of its subsidiaries?

10 A. I have been a consultant for Lockheed in a  
11 training program, teaching some of Lockheed's employees how  
12 to utilize space photography in the early days of the space  
13 program on a very short term basis. And then, when I was  
14 an employee of Texas A & M University, I was involved as a  
15 consultant in producing a photo interpretation key which is  
16 a reference document showing people how to interpret photos  
17 for what is called LACI, large area crop inventory experi-  
18 ment, a global wheat survey that was later expanded to other  
19 crops. And I was a consultant at that time out of Houston,  
20 Texas.

21 Q. How many employees do you have at Air View  
22 Specialists, at the present time?

23 A. At the present time, just -- I'm the only

1 employee; it's just my wife and I own the Corporation. When  
2 we terminated our contract with NASA because of the govern-  
3 ment fund cuts in September of this year, the end of the  
4 fiscal year, '81, we had had three employees for the last  
5 year; and at one time had four or five employees full time  
6 and part time.

7 Q. Approximately how much of your work time is  
8 devoted to work of Air View Specialists?

9 A. At the present time, very little. It's just  
10 the management of the tax records that are required each  
11 year, because I am not doing any contract work for Air  
12 View Specialists at the present time. I was half time for  
13 the last year with NASA because, again, fund cutbacks with  
14 Air View; and I didn't have any other employer at that time.  
15 Prior to that, I was full time for the previous three years.

16 Q. I see that in 1951 to '53 you were in the Air  
17 Force as a fighter pilot; is that correct?

18 A. Yes.

19 Q. So, I see that you received an Honorable Dis-  
20 charge due to a disability retirement. Could you explain  
21 that to me?

22 A. Yes. I was a fighter pilot serving in Japan  
23 Area Defense in 1952, flying an F-80 and returning from

1 a practice gunnery mission one day I ran into turbulence, or  
2 jet wash as it is called, from my leader. I was number two  
3 in a flight of three, and the airplane stalled, fell out  
4 short of the runway, and I hit what's called a dike or  
5 elevated road across the end of the runway; and that crash  
6 broke my back and was subsequently disability retired from  
7 the Air Force.

8 Q. Is my understanding correct that you were coming  
9 in for an approach to land?

10 A. Yes.

11 Q. Do you recall what your air speed was at the time  
12 you hit the -- what did you describe it --

13 A. The dike. It was about a hundred and fifteen  
14 miles an hour.

15 Q. Was there anyone else in your fighter, or was it  
16 an --

17 A. Single seat fighter. I stopped in about thirty  
18 feet, that is, the nose broke off, landed upside down; the  
19 immediate deceleration was probably down to oh, fifteen or  
20 twenty miles an hour. And then the next stop was upside  
21 down in the cockpit.

22 Q. So, the fighter flipped over?

23 A. The nose broke off right behind the seat. The

1 rest of the airplane stayed on the other side of the dike.  
2 Just the nose and cockpit, I was in, flew forward and I was  
3 upside down about thirty feet ahead of where the initial  
4 impact with the dike was.

5 Q. And what was the precise nature of your injury?

6 A. A traumatic fracture of the eleventh thoracic  
7 vertebrae, with spinal nerve involvement.

8 Q. Were you strapped in at the time of the accident?

9 A. Yes.

10 Q. How long were you hospitalized?

11 A. I was hospitalized for about three months in  
12 the Air Force while the broken vertebrae healed and then  
13 given a rehabilitation program for another six months in the  
14 Veteran's Administration where I was discharged; and I have  
15 been under Veteran's Administration care, because I am a  
16 disabled veteran for all these years. But, immediate  
17 hospitalization was about a year including some rehabilitation  
18 time afterwards.

19 Q. And what was your rank at the time of your  
20 discharge?

21 A. Second Lieutenant.

22 Q. Had you gone through ROTC or --

23 A. No.

1 Q. How had you become a pilot?

2 A. Aviation Cadet Program.

3 Q. Did you go through decompression training as a  
4 part of your training?

5 A. Yes.

6 Q. Were you, as a part of that training, ever  
7 subjected to explosive or rapid decompression?

8 A. Yes.

9 Q. Do you recall at what altitudes?

10 A. Yes. We went from a cabin altitude of about  
11 12,000 up to a cabin altitude of 30,000 feet in the  
12 decompression.

13 Q. And this was done in a chamber, and it was  
14 controlled testing; is that correct?

15 A. Yes.

16 Q. How old were you at the time you entered the  
17 Air Force?

18 A. Twenty-one.

19 Q. Was a fighter the only type of aircraft that  
20 you piloted?

21 A. In the Air Force?

22 Q. In the Air Force.

23 A. Yes, although I did have forty minutes in a DC-3

1 one time, twin engine cargo airplane.

2 Q. Are you still able to fly?

3 A. I have my current pilot's license up until I  
4 quit flying. I sold my airplane two years ago. I still  
5 have the flight medical and pilot's license are current, so  
6 I would need to go out and recheck on what's called a  
7 biennial flight review to be determined again; but I have  
8 flown continuously since my Air Force days.

9 Q. Is there any particular reason why you sold your  
10 airplane that you owned?

11 A. Yes. May I put it in colloquial words, every-  
12 thing doubled except income, gasoline, maintenance, insurance,  
13 tie down, everything except income.

14 Q. I know the feeling.

15 A. That's the only reason I quit, because I just  
16 couldn't afford it any more; and also, the contract work  
17 didn't support the airplane because flying has been a good  
18 living.

19 Q. Doctor, I'd like to show you a copy of the  
20 front page of your biographical data and just ask you if that  
21 is, in fact, your CV?

22 A. Yes.

23 Q. And was that prepared by you, sir?

1 A. Yes.

2 Q. And how recently?

3 A. This has been updated as of my new employment  
4 for Lockheed which shows November of '81, so it's within  
5 the last month that that's been updated.

6 MR. CONNORS: The record should reflect the copy  
7 you have has handwritten notations, which I believe are  
8 Mr. McManus'.

9 MR. MC MANUS: Uh, yes. There is no question  
10 that the writing and underlining is mine.

11 BY MR. MC MANUS:

12 Q. Do you have a copy of your earlier CV's with  
13 you?

14 A. No.

15 Q. Could you provide one -- strike that. I  
16 presume, sir, that you did have some type of CV prior to  
17 this one; is that correct?

18 A. Yes.

19 MR. MC MANUS: I would call for the production  
20 of the earlier CV.

21 MR. CONNORS: You want all the previous ones?

22 MR. MC MANUS: The previous CV to this one, yes.

1 BY MR. MC MANUS:

2 Q. Now, Doctor, I see under the description of some  
3 of the Air View Specialists' tasks that activities have been  
4 conducted in various regions, including Southeast Asia; is  
5 that correct, sir?

6 A. Yes.

7 Q. Which countries, in particular, in Southeast  
8 Asia?

9 A. Thailand, the MaKong Delta, Viet Nam, primarily.

10 Q. And what was the nature of your -- Air View's  
11 work in those two areas?

12 A. Developing specifications for detecting  
13 activity of people in the countryside as you might expect,  
14 trying to detect the Viet Cong activities in areas in the  
15 countryside, the roads, the camps, the supply routes and  
16 such. Again, developing specifications, how the particular  
17 aerial photography for those survey work, what kind of films,  
18 filters, techniques, scales, would be used.

19 Q. So, this is -- those projects were different  
20 from land management or crop management and forestry manage-  
21 ment?

22 A. Yes, but the techniques used are very similar.

23 Q. Were you ever personally in either Thailand or

1 the MeKong Delta?

2 A. No.

3 Q. When was Air View conducting these activities  
4 that related to Thailand and the MeKong Delta?

5 A. During the mid-1970's, perhaps even early 1970's  
6 some of the work would have been using space photography  
7 that became available in those days.

8 Q. And you say this was in conjunction with our  
9 government's war efforts in Southeast Asia?

10 A. Yes. Although I am not at liberty to discuss  
11 the customer and any more details of the projects.

12 Q. But Air View was under contract with somebody  
13 to do this work?

14 A. Yes. The work, however, was usually done in  
15 conjunction with one of my other employers, because I  
16 happened to be taking aerial photography and have the  
17 expertise, for example, at Stanford Research Institute,  
18 Earth Satellite Corporation, we did get some of that work.  
19 Also, I had some involvement with the University of  
20 California. They would call me in occasionally on projects  
21 there.

22 Q. Did you personally ever take aerial photographs  
23 of those, either Thailand or the MeKong Delta?

1 A. No. My answer before said I hadn't been there,  
2 so, I can't have.

3 Q. That's why I asked. Perhaps you meant physically  
4 on the ground as opposed to above the ground. Have you used  
5 any of the aerial photographs, either from airplanes or  
6 satellites, that Air View was dealing with in the '70's  
7 in conjunction with the work that Lockheed has asked you to  
8 do for this case?

9 A. No.

10 Q. Did you contemplate using any of those materials  
11 either as a reference point or as actual exhibits?

12 A. No.

13 Q. Do you even have access to those materials?

14 A. No.

15 Q. Do you know that those materials still exist?

16 A. I am sure they do in some government sources.

17 Q. Are you aware that the government in this case  
18 has recently produced a very limited number of aerial  
19 photographs of the crash site, in this case, the CSA case?

20 A. Which photographs would you be talking about  
21 specifically?

22 Q. Well, as far as I know, Plaintiffs have only  
23 been given -- how many, seven or eight.

1 MR. CONNORS: I think he's distinguishing  
2 between all of the photographs that have -- you are talking  
3 about the production made this past week?

4 MR. MC MANUS: There was some more photographs  
5 just produced to us this week by the United States, and  
6 these are aerial photographs showing the crash site. I  
7 believe the days are April 1, one group of pictures; and  
8 April 12 is the date for the other group of pictures. Have  
9 you been shown those pictures by your counsel?

10 THE WITNESS: Yes.

11 BY MR. MC MANUS:

12 Q. Have you considered those in your report or  
13 any of the testimony that you anticipate giving at the trial  
14 of this matter?

15 MR. CONNORS: I am going to object. That's a  
16 compound question. Can you break that up?

17 MR. MC MANUS: Sure.

18 BY MR. MC MANUS:

19 Q. Did you consider those pictures when you  
20 rendered any of the opinions set forth in the report that  
21 you prepared?

22 A. My work was complete before I had access to those  
23 photographs.

1 I would be prepared to use it if it comes up.

2 BY MR. MC MANUS:

3 Q. Since you haven't discussed it, I guess those  
4 will be the extent of my questions on that, but I presume,  
5 if you are going to use it, we will be given fair warning,  
6 so we can -- voir dire the witness

7 MR. CONNORS: For the record, well, you can ask  
8 him any questions you want to about any of those things  
9 right now. He has seen the pictures. He said that. I will  
10 alert you to the fact that we will be amending our exhibit  
11 list to enable the technical correction on the misnumbering  
12 that occurred before, and also the list of those photographs;  
13 and I don't know whether you are going to object to that  
14 or not.

15 MR. MC MANUS: No, because we are going to list  
16 them too.

17 MR. CONNORS: That answers the question. Then,  
18 you can be assured that they will be in the case; and you  
19 can ask the Doctor anything you want to about them.

20 BY MR. MC MANUS:

21 Q. Do those appear to be satellite photographs or  
22 photographs taken from an airplane or can you tell?

23 A. I'd rather not speculate on that question

1 because of security reasons, not because I don't know;  
2 because the Air Force didn't tell me. And there is nothing  
3 constructive to be obtained by speculating or guessing.  
4 The quality of the photography speaks for itself. It is  
5 good clear photography.

6 Q. Does one get better photography from a satellite  
7 or from an airplane?

8 MR. CONNORS: I am going to object to any attempt  
9 to elicit any classified information from this witness; and  
10 you have to realize that there are a variety of satellites  
11 systems. There is NASA information, weather information,  
12 military information, you are going to have to be very  
13 specific or I am going to instruct the witness not to answer.

14 THE WITNESS: Can I give you a generic answer  
15 to that?

16 MR. CONNORS: If you can, within the bounds I  
17 have just layed out.

18 THE WITNESS: It's possible nowadays to just  
19 about do everything from space that we can do from airplanes  
20 within reason, of course, because the systems are good and  
21 the technology permits it to be done. There are naturally  
22 some things from very low altitudes that couldn't be done  
23 by satellite, but the general information photo interpretists

1 use can be obtained from space. Some of the systems are  
2 highly classified.

3 MR. MC MANUS: Perhaps we should put this  
4 on the record. Mr. Connors, are you representing the  
5 United States in this proceeding here today?

6 MR. CONNORS: Not at all, but I am not going  
7 to allow the witness to be put in the position that might  
8 compromise him.

9 MR. MC MANUS: I certainly don't want to do that,  
10 and I think the witness understands from the comments I  
11 have made before. I don't want to do that. I should also  
12 note for the record, the Government is aware of today's  
13 deposition; there is no one here representing the Government  
14 and that's apparently by their choice.

15 BY MR. MC MANUS:

16 Q. Dr. Welch, are you either employed or under  
17 contract by the United States Government at this time,  
18 in any way?

19 A. No.

20 Q. Have you in the past been employed or under  
21 contract by the United States Government in any matter which  
22 might in any way relate to the crash of the C5A, the site  
23 of the C5A crash, or anything in any other way that might

1 Q. Do you anticipate using those photographs in any  
2 way when you testify at the trial of this matter?

3 MR. CONNORS: Well, my objection is, you mean  
4 in explaining his testimony, or does he contemplate in using  
5 them as exhibits? He doesn't know whether we are contemplat-  
6 ing using them as exhibits. We haven't even discussed that.  
7 If you mean does he, does he need them or something like  
8 that, that's a different question.

9 MR. MC MANUS:

10 Q. No. And I understand your difficulty with,  
11 does he need -- do you plan on using them in any way at  
12 this point, would they be helpful to you?

13 THE WITNESS: I think they would be helpful  
14 in that is a vertical perspective which we photo interpreters  
15 like to have. That is, you are looking straight down on the  
16 scene which makes the scene appear like a map; but as far  
17 as being able to extract additional information from what  
18 I have been able to see from the other photography, I would  
19 say definitely, no. I do not see anything new in that that  
20 would tend to add or to even change an opinion I might have,  
21 but I'd like to use that for any discussions, because it's  
22 a plane view, that's looking straight down on view. And  
23 whether it comes up or not, we haven't made that decision.

1 touch on the crash of the C5?

2 A. No.

3 MR. CONNORS: I apologize. I see where you are  
4 going with your question. I didn't realize that's the  
5 direction you were taking.

6 BY MR. MC MANUS:

7 Q. So there is nothing about the precise photos  
8 that have been produced by the government that in any way  
9 have been classified that has anything to do with your  
10 employment or association with the government?

11 A. (Indicating the negative.)

12 Q. Is it still your feeling that you can't tell  
13 me whether or not you think the photographs produced by  
14 the government, which, by the way, the letter we got from  
15 the government says they have been declassified; and I  
16 will be happy to show you that letter if you want to see  
17 it. And I think your counsel will agree that those photos  
18 were declassified by the government. Is it still your  
19 position that you can't tell me whether or not you think  
20 those are satellite photos or plane photos?

21 MR. CONNORS: Just a minute. I want to pose  
22 an objection. Mr. Dumbroth in Court the other day indicated  
23 that the photos had been declassified. I believe he also

1 specifically said that the source of the photography was  
2 not available and would not be declassified and that that's  
3 certainly what the government has told us when we asked  
4 about that and Dr. Welch has indicated that he could not  
5 speculate on that which leads me to believe that he would  
6 have to make an estimate or guess or something. I don't  
7 want him guess.

8 MR. MC MANUS: I don't want to know if it's from  
9 the most secret super sophisticated satellite. I am not  
10 asking him to name what system or anything, just whether  
11 he feels it was photography that was done by an airplane  
12 or photography that was done by a satellite. I don't think  
13 that gives away any U. S. military secrets. Everybody has  
14 read in the newspapers or who has listened to radio reports  
15 knows that everybody has got satellites up there looking  
16 down at everything down here.

17 MR. CONNORS: There is a very serious problem,  
18 I think, in that photographs of that nature can also be  
19 taken by aircraft. The type of system that could even be  
20 remotely compromised by such an expert as Dr. Welch's  
21 qualifications, I don't want that to happen.

22 MR. MC MANUS: I don't want him to feel that  
23 he's compromising any oaths or any allegiance that he has

1 to the government or any of its agencies, because I certainly  
2 -- you know, it's not my intent to try and get military  
3 secrets out here.

4 MR. CONNORS: I think these questions ought  
5 to be put to the source of the information, the United  
6 States Government; and I really think we are trading -- I  
7 don't want to get into that, and I will direct him not to  
8 answer. And you can resolve it with the government somehow.  
9 I just don't want him speculating, and I don't want his  
10 position compromised in any way. And I don't really think  
11 it adds anything according to what he just said, to the  
12 interpretation of pictures.

13 BY MR. MC MANUS:

14 Q. Doctor, can you tell me whether or not it is  
15 the practice of whomever took the photos that were recently  
16 produced by the government, to take daily photos?

17 MR. CONNORS: Wait a minute.

18 MR. MC MANUS: To take photos daily?

19 THE WITNESS: They probably fly daily, but if  
20 you are talking about anything specific, the answer relates  
21 to technical matters; I don't know the technical requirements  
22 for that particular piece of ground or otherwise. But they're  
23 in the business of taking photography to support their

1 strategic and tactical operations and so far as I can  
2 speculate.

3 Q. Well, I think there maybe some more questions  
4 relating to this; but if you are instructing him not to  
5 answer, I won't waste both our times by asking him here.  
6 We'll just have to raise the issue sometime before the  
7 Courts.

8 THE WITNESS: Well, I don't know. I wouldn't  
9 speculate because nothing constructive would come from it  
10 than. If you would like to know, then you go to the source  
11 and that will protect you, them, and me all as far as their  
12 willingness to give any detailed discussion of where it  
13 came from and how it was produced.

14 MR. CONNORS: My only concern relates to the  
15 questions directed at the sorts which don't seem to pertain  
16 to substantive matters as to what the pictures indicate,  
17 and your ability to interpret it.

18 BY MR. MC MANUS:

19 Q. Let me ask this question: Does it matter if  
20 the pictures are from an airplane as opposed to a satellite  
21 in your reaching any conclusions?

22 A. Not at all. I always let the photos speak for  
23 themselves. The quality can vary from day to day, sun angle

1 to sun angle, clouds or no clouds, film, filters and the  
2 photos speak for themselves; that's all I, as a technical  
3 interpreter, would be interested in. It doesn't make any  
4 difference to me. Photogrammetry, whether taken in space  
5 or aircraft; and I would think have no bearing on the  
6 interpretation of this photography, or interpretability of it.

7 MR. CONNORS: Does that satisfy your needs,  
8 I hope?

9 MR. MC MANUS: Not in all respects, but I  
10 understand. I am sympathetic to Dr. Welch's concerns, and  
11 I don't think anything the Plaintiffs have ever done, has  
12 ever been in an attempt to disclose secrets of our govern-  
13 ment that would damage the national security. I think we  
14 have been very sensitive to that, as evidenced by our  
15 voluntarily advising the parties and the Judge that we had  
16 been given classified material, speaking of the Life  
17 Science Report and that being done without having given that  
18 information to any of the experts, in the matter. And so,  
19 I think we have been sensitive to that, and no one's ever  
20 accused us of that, to our face, to my knowledge.

21 MR. CONNORS: Not that this area is extremely  
22 sensitive to the government, I think. And certainly that's  
23 the impression we got from the description by Mr. Dumbroth

1 the other day and from our conversation with government  
2 counsel.

3 MR. MC MANUS: I am sure counsel understands  
4 your difficulty. The government's a Third-Party Defendant  
5 in this action; and if there's factual matters that might  
6 be more clearly determined by free access to all the  
7 material that everyone has rather than just being limited  
8 to the government --

9 MR. CONNORS: I realize that. I still think  
10 you are asking the wrong person.

11 THE WITNESS: I don't know the answer to your  
12 question and speculation proves nothing.

13 BY MR. MC MANUS:

14 Q. Doctor, I notice that between -- strike that,  
15 please. In 1963 you became a research engineer at Mark  
16 Systems; is that correct, sir?

17 A. Yes.

18 Q. Between 1956 and 1963, was your -- were your  
19 sole work experiences done in conjunction or in connection  
20 with Air View Specialists?

21 A. Correct.

22 Q. What is Marked Systems, Inc.?

23 A. It's a defunct photo optical engineering company.

1 Q. And what did they do?

2 A. They made bimat processing, b-i-m-a-t, process-  
3 ing systems, stabilized optics; and we performed photo  
4 interpretation and research.

5 Q. What type of photo interpretation research were  
6 you involved in with Mark Systems?

7 A. I was involved in a classified global agricultural  
8 survey project developing specifications for crop interpreta-  
9 tion on a global basis.

10 Q. And was this in conjunction with government  
11 contracts or commercial contracts?

12 A. Yes. Government.

13 Q. Government contracts. Was any of this work  
14 classified?

15 A. Yes.

16 Q. Was it all classified?

17 A. Yes.

18 Q. Can you tell me if it was for the Agriculture  
19 Department or the Corp of Engineers or the Defense Department  
20 or, who was it for?

21 A. The U. S. Government.

22 Q. So, you are telling me you can't tell me any  
23 further than that; is that right?

1 A. That's right, the customer was classified.

2 Q. Did you have to take some sort of oath when  
3 you were working on this classified government project?

4 A. Yes, as part of the government security  
5 program with working with industrial companies.

6 Q. Are you bonded?

7 A. Standard clearance, security clearances, that  
8 are issued by the U. S. Government.

9 Q. Are you bonded in any way?

10 A. Bonded in terms of money. I don't think so, but  
11 we could lose our job and potentially be imprisoned if I were  
12 to divulge information that was classified.

13 Q. And is it your understanding that your inability  
14 to talk about the project goes beyond your employment and is  
15 a lifetime bar?

16 A. I have not heard that the projects have been  
17 declassified as such. I gave you the generic description,  
18 a global agricultural survey, and that is about as far as  
19 I can go without talking about things that I have not heard  
20 has been declassified.

21 Q. Now, it says here that you were a research  
22 engineer. Do you have any type of engineering degree?

23 A. No.

1 Q. What does research engineer mean, then, in  
2 terms of your employment?

3 A. The term that that particular company used in  
4 the slot I was involved in, it was primarily a company title.  
5 It did not in any way reflect my degree, academic achievements.

6 Q. Are you familiar with Air America? Do you know  
7 who Air America is?

8 A. I know who they are, but your question about  
9 familiarity is a little nebulous. I know who they are and  
10 what they did as far as flying airplanes but that's  
11 absolutely all I know about -- they flew airplanes, and I  
12 think I know who their customer was; and probably you do, too,  
13 not the customer but who the parent organization was.

14 Q. Who do you think the parent organization was?

15 A. Probably the CSA; is that correct?

16 Q. You will have to ask the source. How did you  
17 happen to become employed at Mark Systems?

18 A. Mark Systems had an employee that was looking  
19 for some expertise and had been given my name by the  
20 University as one who might help and a man came to see me  
21 about a project and asked me if I would be interested in  
22 going to work for them. And it appeared to be an opportune  
23 step to take in my career.

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MR. MC MANUS: We have been going for about an  
hour and a half. Would you like something to drink and  
take a break?

(A brief recess was had.)

2 Q Dr. Welch, in 1966 you moved over to the Stanford  
3 Research Institute; is that correct?

4 A Yes.

5 Q Is that in any way connected with Stanford  
6 University?

7 A Yes, it's a research organization that was founded  
8 by some of the university people but it's a separate economic  
9 entity, in other words, the budgets are different, I think  
10 some of the Boards of Directors are similar or the same.

11 Q And, what was the nature of your work with the  
12 Stanford Research Institute?

13 A Photo interpretation in water resources, pollution  
14 studies, some systems analysis for the military reconnaiss-  
15 sance activities.

16 Q Was any of your work at Stanford Research Insti-  
17 tute classified?

18 A Yes.

19 Q And I presume again that the employer was the  
20 government and that's as far as you can go?

21 A Yes. I think I could be more specific in that  
22 some of the work was for the U. S. Army and some of the work  
23 for the U. S. Air Force, the military branches, primarily.

Q Did you do work at the institute that was not  
classified?

A. Yousaf

8 And what --

A State of California Water Pollution Studies, that place in San Diego Bay, to clean up the waters in the Diego Bay; San Francisco Bay area, for primarily developing specifications, again, in the taking of aerial photography for detection and analyzing water pollution.

4. And did you take the aerial photographs in those studies yourself?

L Yes.

4 And then you interpreted them?

**L** Yes.

Q How were they then utilized?

16       A       Utilized by the State of California in their Water  
17       Pollution Abatement Programs, enforcement, and the techniques  
18       that we developed were used by the State and their own  
19       people. We did not, as such, go out on enforcement activi-  
20       ties but we developed the techniques so they could do them,  
21       we evolved the research aspects.

9 Did you prepare any reports or manuals or anything  
that were then presented to the various State agencies?

1 A There were reports prepared and I don't know where  
2 those reports would be if you are leading to producing them.  
3 I am not sure that I can have access to them. They weren't  
4 classified as such, but they were for an industrial company  
5 15 years ago and there was some kind of a report to the  
6 customer, yes. Some of the work was also in-house work that  
7 is paid for by SRI at Internal Research Activities.

8 Q You have mentioned the use of remote sensing in  
9 your water pollution studies and work, could you describe  
10 precisely what that means?

11 A Remote sensing?

12 Q Yes.

13 A The collection of data without actually being in  
14 contact with the object or scenes exemplified by a photo-  
15 graph. There are many other forms of remote sensing. In a  
16 way, the human eye is a remote sensing device because it  
17 sees something at a distance.

18 Q What are some of the other devices?

19 A Radiometers, magnetometers, scatterometers, radar  
20 mapping devices, thermal mapping cameras, p-h-e-r-m-a-l,  
21 thermal.

22 Q What's a scatterometer?

23 A It's a radar device that looks usually at passive

1 microwaves reflected from a surface such as a sea surface  
2 could be -- look at the sea state, as they call it, for  
3 meteorological and oceanographic studies.

4 Q And the project that you have done for Lockheed on  
5 conjunction with the CSA crash, did you use any of the remote  
6 sensing instruments or procedures that you have just  
7 described or were you limited to photographic materials?

8 A Purely photographic materials that we have seen  
9 here, and I think they have all been available to you. It  
10 is just the paper prints and transparencies from photo-  
11 graphic cameras.

12 Q Now, in 1970, you moved over to the Earth  
13 Satellite Corporation, is that correct, sir?

14 A Yes.

15 Q And what is the Earth Satellite Corporation?

16 A It's an organization devoted to consulting ser-  
17 vices and contract services in remote sensing for general  
18 interests, industries and governments on a worldwide basis.

19 Q And what were your duties?

20 A Well, as shown in my resume, I was office manager  
21 of the Berkeley Office of the Satellite Corporation and the  
22 headquarters is here in Washington and also I managed  
23 programs of teaching in remote sensing for a number of

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customers around the world in sophisticated remote sensing  
systems including aerial photography, space photography,  
radar, thermal mapping, and the administration of activities  
related to contract work and as well as the office operations.

Q How much of your time was devoted to your administrative and managerial tasks as opposed to the others that you have enumerated?

A Administrative was probably 20, 25 percent of my time.

Q And, was any of the work that you did with Earth Satellite Corporation classified work?

A Yes.

Q About -- strike that, please. And, classified, again, for the United States Government?

A Yes.

Q Can you give me any further breakdown than the government, as being your client?

A Not in this case, no, the case of Earth Satellite.

Q How much of your work while at Earth Satellite Corporation was for the government and classified in nature, what percentage?

A There would be periods of time where I would be full-time on a project and there would be other periods of

1 time I would be zero-time on a classified project. As you  
2 probably are aware, contract work requires people to go in and  
3 out of the contracts. So, as the total of average over the  
4 five years I was there, the classified work may have been  
5 25 or 30 percent and the remainder was unclassified.

6 Q And what was the major thrust of your nonclassi-  
7 fied work?

8 A Teaching.

9 Q Teaching?

10 A Teaching various customers their technical people,  
11 how to use space and aerial photography. Again, this was  
12 during the emerging time of the space program, the land Sat,  
13 Satellite, Program, and teaching various government employees  
14 of the governments and states around the world to interpret  
15 the photography.

16 Q Were your students all in various government  
17 agencies or were there any commercial companies that also  
18 sent people?

19 A Probably 90 percent government, 10 percent would  
20 be some industry related to that country. Sometimes we  
21 trained on site in the customers country and sometimes we  
22 trained here in the U. S., either Washington or Berkaley.

23 Q What was the reason for your leaving Stanford

1 Research Institute and moving over to Earth Satellite Corpor-  
2 ation?

3 1 The contract work I had been involved in at  
4 Stanford ran out, my funding ran out, and I had been looking  
5 for other work and at that time Earth Satellite Corporation  
6 was opening a Berkeley Office and through my contacts at the  
7 University of California, Dr. Colwell, specifically, I was  
8 asked to join him in opening that office.

9 Q And you left Earth Satellite in 1975; is that  
10 correct?

11 A Right.

12 Q At any time prior to 1975, in any of your work  
13 experiences, had you done contract work either directly or  
14 indirectly for Lockheed or any of its subsidiary corpora-  
15 tions?

16 MR. CONNORS: Other than he's already specified?

17 THE WITNESS: No, just what I said.

18 BY MR. McMANUS:

19 Q I know you told me before that you had done some  
20 in conjunction with NASA.

21 A There was none before '75, there was an hour  
22 lecture I gave one time but that was hardly an employees  
23 situation. It would be consulting. I talked about, at

1 Houston, was after '75, it was while I was at A & M.

2 Q Do you recall what your lecture topic was?

3 A The use of color photography in water resources,  
4 I believe that sort of thing. That's what my expertise was  
5 at the time, pollution studies were talking about the State  
6 of California, that was that sort of thing.

7 Q How did that involve Lockheed?

8 A They had a lunch time meeting and they wanted  
9 someone to speak to it. That's what it was. I was just  
10 called in as somebody to fill a slot.

11 Q And in 1975 you moved to Texas A & M University;  
12 is that correct?

13 A Yes.

14 Q How did that come about?

15 A Again, contract work ran out at Earth Satellite  
16 Corporation and during that period of time we lost over a  
17 third of the professional staff at the Earth Satellite  
18 Corporation to various other groups and I had been asked to  
19 come down to A & M to teach and do research by an associate  
20 there and, as my employment terminated at Earth Satellite,  
21 I moved on over to Texas A & M University.

22 Q And you were there for two years; is that correct?

23 A Yes.

Q How much of your time was devoted to research?

A It was about 80 percent research and 20 percent teaching.

Q      What were the areas of research?

A Coastal zone aerial photography, photo interpretation, and we utilized space photography from the Land Sat System at the same time along the Texas and Gulf coast areas, Texas, Louisiana, Gulf coast areas, for vegetation, soil, sand inventory work and there was some aquatic vegetation studies, Texas and other areas along the Gulf coast are being overrun by aquatic vegetation, weeds as such, and we were doing a survey there at the university in that kind of work in research and then I was also involved in consulting with NASA, as I indicated, the LACI, Large Area Crop Inventory experiment, down at Houston and developing of specifications for the space program.

Q If you had to put a classification term on it, what would be the classification term of the major thrust of your research?

MR. CONNORS: I don't understand the question.

BY MR. McMANUS:

Q I.e., is this land management purposes or to help farmers grow crops -- in a better method or manner --

1 A Remote sensing's primary thrust is data collection.

2 There were some applications and the application has to  
3 require information such as growing crops, inventorying  
4 resources, whether it's forestry or water resources or  
5 animal resources, livestock and such. So that when we would  
6 classify it, it's a data collection for some other application.  
7 I would say natural resource work inventory work for manage-  
8 ment activities and for detecting of available materials,  
9 considerable amount of work in detecting such things as  
10 sands and the gravel for construction work and this is  
11 revealed by the surface conditions of vegetation it reveals  
12 what the soil type is made up of.

13 Q Now, is this done through photography?

14 A Yes, photography and ground checking.

15 Q So, you did verify everything by a ground check?

16 A Yes.

17 Q Was any of that work classified?

18 A No.

19 Q And I presume that none of the the teaching chores  
20 that you had were classified?

21 A That is correct.

22 Q And that took about 20 percent of your time?

23 A The teaching part did, yes.

2        Q      Were you teaching undergraduates or graduate

3        students?

4        A      Graduates.

5        Q      Graduates. In what field were these students?

6        A      They were in a number of fields, I was teaching  
7                through the Range Science Department and the students came  
8                from agriculture, forestry, agronomy, livestock, urban  
9                planning, general cross section of the students that wanted  
10               to get information on remote sensing, using a data collec-  
11                tion and data interpretation.

12        Q      Did you have -- strike that, please. Did you  
13                teach courses that were listed in the college curriculum and  
14                were available to anybody that wanted to take them?

15        A      Yes, as such, my courses would have been listed,  
16                when you are teaching graduate courses, they are usually to  
17                a specific need rather than to required courses that every-  
18                one has to take. They are geared to a particular student  
19                need, student requirement.

20        Q      Did your classes meet at regularly scheduled times?

21        A      Yes.

22        Q      Classrooms on the campus of Texas A & M?

23        A      Yes.

24        Q      And you had to give grades and things like that?

1 A Correct.

2 Q Do you recall the precise name of the courses  
3 that you taught?

4 A A general title, Remote Sensing for Natural  
5 Resource Management, would be that sort of course.

6 Q And while you were at A & M, how many courses did  
7 you teach?

8 A I taught two courses in two separate years.

9 Q So, four altogether?

10 A Yes.

11 Q And did you have a title?

12 A I was what I called Visiting Associate Professor.

13 Q Did your course work include field projects?

14 A Yes.

15 Q Were the students taught how to take aerial  
16 photographs or just how to interpret them?

17 A Very minimally, the kind of thing a student could  
18 do by renting an airplane and using his own personal camera  
19 but it was not a sophisticated mapping type of photography  
20 that a student would have access to.

21 Q Now, in 1977, you were doing contract work for  
22 NASA; is that correct?

23 A In '77 I was an employee of Texas A & M University

1 who was in turn under contract with -- starting in '77,  
2 right. '77 through '81, that's correct.

3 Q And the contract was with Air View Specialists;  
4 is that correct?

5 A The first year was with Humboldt State University  
6 Foundation and the reason for that is that they needed a  
7 rapid -- a way to make the contract rapidly and they could  
8 do that through a grant mechanism and I was brought out from  
9 Texas to start the Western Regional Application Program  
10 under Humboldt State University's Foundation but they could  
11 not continue that because it was not a mechanism that was  
12 defined for contract work and it took that long to get a  
13 contract set up with Air View Specialists Corporation. So,  
14 I had a short period of time where I was actually paid by  
15 the State of California through the Humboldt State University  
16 Foundation but it started in '77 and the same contract con-  
17 tinued, it was just that we set up a contract mechanism.

18 Q And your four years as a contractor at NASA was  
19 for the same project; is that correct?

20 A Yes.

21 Q Was the project completed in 1981 or was it, for  
22 some reason, terminated in 1981?

23 A It was terminated because of budget cuts. The

1 work was not completed, it was the Western Regional Applications Program that was set up to train state agencies how to  
2 use aerial and space photography and the three regions in  
3 the U. S. and we were the Western Region and there are  
4 14 western states and the budget got cut for technology  
5 transfer and therefore the contract was terminated.

6  
7 Q What was your primary function during the period  
8 of that four year contract?

9 A I was both administrative manager for the contract  
10 because it was my own corporation and I was also in charge  
11 of designing and conducting the remote sensing courses. We  
12 would actually develop the curriculum, to meet a specific  
13 state's needs and we would -- I would give lectures for  
14 courses, for those state agencies, again; we had 14 western  
15 states and we covered at one time or another, every one of them.

16 Q You have been using the term, we, who were you  
17 working in conjunction with?

18 A I had one associate, Professor Charles Poulton, a  
19 retired professor from the State University who was my  
20 associate and my employee because he was working for Air  
21 View Specialists but definitely an associate and the two of  
22 us would develop the curriculum, develop the lectures, the  
23 slide materials, the outlines that we would use and then we

1 could actually conduct the courses.

2 Q Is it fair to characterize your job as primarily  
3 that of being a teacher during that four year period of  
4 time?

5 A Primarily, if you would add to it secondarily a  
6 technical consultant because we would not only teach the  
7 people but we would follow up with them in helping them  
8 develop the techniques for their own uses in each of the  
9 states. We had wild land managers, including agriculture,  
10 urban planning, foresters, wildlife managers, that would  
11 come to us for training and then we would follow up and give  
12 them additional on site consulting.

13 Q Was any of the work done in conjunction with this  
14 contract classified?

15 A No.

16 Q Was the contract a series of four one year  
17 contracts or was it a unitary four year contract?

18 A The first year, again, was Humboldt State Univer-  
19 sity Foundation and then our contract was a three year  
20 contract renewable each year, three years and that they had  
21 options to renew and each year was renewed depending on the  
22 work load and the budget that they had. The work load as  
23 they saw from each of the states and backing that NASA was

1 giving them to do the work.

2 Q Was it a unitary contract price or were you paid  
3 by the hour, day, week --

4 A It was a total number of hours to be put in during  
5 the time we were full-time. It was 2,080 hours per person  
6 per year, the 20/80 number, it was 88 in Leap Year because  
7 we had an extra day. Then we were half time for a little  
8 over a year because the budget was cut for each of the  
9 primary people, Poulton and myself, we were half of 20/80  
10 or 10/40.

11 Q And how much was the contract for?

12 MR. CONNORS: What do you mean?

13 MR. McMANUS: Monetary terms.

14 THE WITNESS: The total contract over the three  
15 years, I think, went to \$280,000, I don't know exactly, I  
16 could look it up if it's important but that is the ball park.

17 BY MR. McMANUS:

18 Q And you say the contract was terminated in '81  
19 because of funding cuts by NASA?

20 A Yes.

21 Q Do you know whether the work performed in conjunc-  
22 tion with the Western Regional Application Program was picked  
23 up and then paid for by any of the states or other government

1       agencies that might be using the services?

2       L       No, it was paid for exclusively by NASA.

3       Q       After '81, did anyone else come in and say, we've  
4       got the money and we want to keep the program going?

5       L       (The witness indicated in the negative.)

6       Q       Was there any attempt by you or anyone else to try  
7       and find other funding?

8       L       Not as far as I am aware, NASA may have looked for  
9       cooperative funding for their technology transfer activities,  
10       but at least for the part of the project I was working on,  
11       that is the teaching, it was no indication of other sources  
12       solicited.

13       Q       And in late 1981 you -- strike that, please. Now,  
14       at some point in conjunction with your NASA project, you did  
15       work for Lockheed or with Lockheed; is that correct?

16            MR. CONNORS: Which NASA project?

17            MR. McMANUS: Any that he was ever involved with.

18            THE WITNESS: Down at Texas A & M would have been  
19       the only involvement and I was an employee of the Remote  
20       Sensing Center at Texas A & M University and they, in turn,  
21       had a contract for my services paid for by Lockheed who was  
22       paid for by NASA to produce the photo interpretation I  
23       described. So, the NASA money paid Lockheed and was

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contracted to A & M for my services.

BY MR. McMANUS:

Q And in 1981 you became a full-time employee of  
Lockheed Missile and Space Company; is that correct?

A That's correct.

Q What are your duties there?

A They have not been defined yet. I started there November 30th and the group I'm assigned to is involved in classified work and I have not had access to that yet, so I have been in what's called a holding position until my clearances are processed and at that time I will be involved in -- as far as I understand, remote sensing research work for the U. S. Government and as I say, I haven't had access to what that is or even who the customer is because that's not been divulged to me and I have not been in the group that I am going to be working with because they are in a classified facility and I have been loaned out to another group and then have been asked to help on this project. Maybe I should explain a little more, if you would like to know how I became involved in this project.

Q I am going to ask you that. So, I don't want you to think I am cutting you off but I am going to ask that in a very short while. What is your annual salary that

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Lockheed Missile and Space Company pays you?

A \$45,000.

Q Now, Doctor, other than the Bachelor's Degree, Master's Degree and Doctoral Degree that we have already discussed, do you have any other academic degrees?

A No.

Q Do you have any other areas in which you have undertaken an academic study but not completed the work for a specific degree?

A No.

Q Now, Doctor, you have been asked by Lockheed Aircraft Corporation to do a project for them in conjunction with the litigation surrounding the crash of the C5A which occurred in April of 1975 --

MR. CONNORS: I want to object to the form of the question, you can go ahead and answer.

THE WITNESS: Now, I have got to tell you how I got involved in the project. I was unemployed as of the end of September, looking for work. I sent out perhaps a half dozen applications to a number of companies including universities, around the west and one of them was to Lockheed Missile and Space Company in Sunnyvale which is right across the field from NASA where I worked. NASA is on

1 one side, Moffett Field is in the middle and Lockheed is on  
2 the other. I had been given a name of somebody that used to  
3 work on the project as a source to go through and this was  
4  
5

6 Q Which project?

7 A This was just Lockheed's employment, it has nothing  
8 to do with the C5A.

9 Q You mentioned, this project.

10 A The project that I am now working on at Lockheed  
11 which is classified that I don't know about. It has nothing  
12 to do with the C5A activity. The person that used to work  
13 at Technicolor Graphics, Willie Todd, left Technicolor and  
14 went to Lockheed and it was through him that I was able to  
15 get my application in to the right people. That occurred in  
16 October and with the usual response, well, we'll look at  
17 your resume, don't wait around, and I didn't think at that  
18 time I had any possibility of being employed at Lockheed. I  
19 subsequently got a phone call from Robert Macomber who used  
20 to work with me at Earth Satellite Corporation. He was in  
21 the Washington area, he was working at the Washington Office  
22 and I was at the Berkeley Office. He is now in a private  
23 business of his own. He asked me if I would be interested  
in working as a consultant. At that time, again, I was

1 unemployed, working as a consultant on an investigation of  
2 a C5 crash that took place in Saigon in 1975. I said, well,  
3 tell me a little more about it.

4 Q And who was that?

5 A Bob Macomber. He described that a crash had  
6 occurred and some photography was available and that there  
7 was a lawsuit regarding some of the surviving children and  
8 that an expert was needed to interpret the photography and  
9 try to reconstruct as much as possible the crash sequence of  
10 the aircraft.

11 Q And when was the discussion with Mr. Macomber?

12 A That was during the month of late October, as I  
13 recall, early November, and while I was still unemployed and  
14 had not --

15 Q Of 1981?

16 A Of '81, and I had not reached any agreement with  
17 Lockheed and at that time I didn't think I was going to be  
18 employed there. I was talking to the University of Idaho at  
19 Moscow to go to work for them and I told Mr. Macomber, yes,  
20 I was available and I would like to look at it a little more.  
21 He said well, you would be paid by Haight, Gardner, the legal  
22 firm, and he did indicate that it was Lockheed that was a  
23 Defendant but in this case I wouldn't be paid by Lockheed, I

would be paid by the attorney firm as a consultant. So, at  
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that time, I said, well, I need to know a little more about  
it. First, to know whether I can do you any good and whether  
I am willing to spend my time that way, whether it was a  
reasonable idea that I could help and I said, well, I will  
need to come back and talk to the attorneys. I'd like to  
look at the data. So, we set up an appointment for me to  
come back in the middle of December to look at the data and  
discuss the possibilities of being an expert witness on the  
project.

I did add, at that time, that I have turned in an  
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application for work at Lockheed but I had not heard whether  
I would be employed there or not and, if this is an issue,  
you had better talk to the attorney firm and see whether I  
would be considered a biased witness. I had not agreed to  
employment, they had not offered me a job at that time. I  
came back -- well, it's a little earlier. I accepted a  
position with Lockheed on November 30th and went to work for  
them at that time, and had, at that time, an appointment to  
come back here. I had to ask my supervisor and the legal  
counsel at Lockheed Missile and Space Company, if I could  
have time off from my regular work to come back here, not,  
again, as a consultant, but I said that I would either work

1 as Lockheed's employee or, if they didn't like that, I would  
2 take leave without pay and come back as a private consultant,  
3 with their concurrence. And they didn't ask me to come back  
4 here and work on this project, I believe that was your ques-  
5 tion initially. I actually asked permission from them to  
6 come back here and work on it and since I didn't have any  
7 work to do there at the present time, because I was waiting  
8 for clearance, I was in what's called a holding position, I  
9 was helping some people with some library type research,  
10 they said no problem, you can have time off to go back there  
11 and you might as well go as an employee of the company rather  
12 than take time off because this is the way we were paid any-  
13 how.

14 Q Who was the supervisor that you asked?

15 A Mary Grace Fowler. She is the lady I will be  
16 working for and she is a Lockheed employee.

17 Q What's her title, position?

18 A I don't know what her title is, she's a group  
19 manager.

20 Q And the legal counsel?

21 A Legal counsel is Donald Christianson at LMSC,  
22 Lockheed at Sunnyvale and Robert Barton in Georgia. I subse-  
23 quently got a phone call from Mr. Barton who had to approve

1 my travel expenses and time to come back here and I have  
2 offered to either take time off work and work as a consul-  
3 tant or as an employee. That didn't have any bearing on my  
4 part.

5 Q Have you ever had any other conversations with  
6 Mr. Barton?

7 A Only enough to get authorization to pay my way was  
8 all and I did -- I didn't talk to Barton until after I had  
9 signed on with the company, in fact, within just a few days  
10 -- this would have been early December, the time I was  
11 making my reservations to come back, I was here the 15th of  
12 December for the initial look at the data. That was the  
13 first time I had any access to the data.

14 Q So, who do you understand is paying for whatever  
15 you bill for this project connected with the C5A?

16 A Lockheed is paying my salary and my expenses in  
17 this particular effort.

18 Q So, it's not your impression that Haight, Gardner  
19 is paying you?

20 A No, the initial contract was from them, they were  
21 willing to pay me as an unemployed consultant, as a  
22 noncommitted consultant.

23 Q I understand that. So, the materials and stuff

1 that you used are all materials that you have access to as  
2 an employee of Lockheed?

3  
4 MR. CONNORS: Pardon me, could you repeat that  
5 question, please?

6 BY MR. McMANUS:

7 Q Any materials that you may have to use in conjunc-  
8 tion with your projects, measuring instruments, whatever  
9 you might have used, are materials that were provided to  
you by Lockheed; is that correct?

10 A No, they were all provided by Haight, Gardner, my  
11 office at Lockheed knows almost nothing about what I am  
12 doing. I have not had to explain anything to them, they just  
13 said, fine, if you are cleared with the legal people you can  
14 go ahead and do what you want. They have shown no interest  
15 and have not briefed me in any way about it. The materials  
16 seen, the hardware I have worked with, either my own personal  
17 materials, such as a ruler a little magnifying glass and  
18 stereoscope, which is the only hardware, or the photographs  
19 that Haight, Gardner has provided, Lockheed has provided me  
20 with absolutely nothing.

21 Q What's the stereoscope, is that a measuring device?

22 A No, it's a device to look at stereo photographs in  
23 3D.

1 Q 3D? Do you have that with you?

2 A We brought one, yes.

3 Q Good. Dr. Welch, could you tell me what was the  
4 task that was given to you related to the CSA Project you  
5 have been working on.

6 A To look at the aerial photography and as far as  
7 possible -- I should say aerial and ground photography --  
8 and far as possible reconstruct the events of the crash from  
9 touch down, to final resting place of the aircraft parts,  
10 determining something about the forces involved, the break  
11 up involved, all based on the indications on the photographs  
12 that would be vegetation conditions, soil conditions, that  
13 would be visible on the photography.

14 Q Have you ever done a project like that before?

15 A Not as such for an airplane crash but the -- all of  
16 the aspects, the technical aspects of the photo interpreta-  
17 tion of vegetation, soils, and ground indicators has been  
18 part of my primary activities for nearly 30 years.

19 Q But you have never tried to reconstruct a crash or  
20 determine forces and the other things you have mentioned?

21 MR. CONNORS: Objection.

22 MR. McMANUS: Prior to this project; is that  
23 correct?

1 MR. CONNORS: I think you are reading something

2 into his answer about the forces, you better clarify that.

3 BY MR. McMANUS:

4 Q Just repeating what he --

5 THE WITNESS: By forces I mean those forces that  
6 would tear up soil and remove vegetation, scrape off soil  
7 and vegetation; the forces which would be a piece of metal,  
8 not forces from a physicist's viewpoint, perhaps.

9 MR. CONNORS: He has not been asked to do calcula-  
10 tions of forces involved in a crash with respect to their  
11 relationship to the passengers.

12 BY MR. McMANUS:

13 Q Well, you are not an aeronautical engineer, is that  
14 correct? Nor are you a physicist; is that correct?

15 A No.

16 Q Now that we have those things clearly understood,  
17 I will ask my question again. This is, then, the first time  
18 that you have been asked to reconstruct an accident in the  
19 manner that you described to me, as your task, involving an  
20 airplane crash?

21 A I believe so, it seems to me -- let me think about  
22 that for a minute. We -- I was involved at Mark Systems in  
23 a project to look at the ground indications of a recovered

spacecraft from a reentry project so it again involved ground indications of a piece of hardware but I don't recall an aircraft crash, as such.

2 How about an automobile crash or any type of moving vehicle crash?

1. No.

9 So this would be the first time, then, other than  
satellite?

A My recollection -- I'd have to think about that.  
There has been none of them recently, anyhow, that I have  
been involved in.

9 Do you recall what was entailed in the satellite investigation that you mentioned?

A Yes, there was a reentry testing of a nose cone that had cameras on board and we had to locate those nose cones, pieces of hardware, that in this case came down in the State of New Mexico, and then somehow determine how the reentry occurred and the travel of the spacecraft as it came back into the atmosphere.

8. What were you able to determine in that study?

A. Through analysis of the photography, we were able to reconstruct the angle of entry of the nose cone and the distance traveled, the trajectory travel, as based on looking

1 at the photography that the cameras took that was in the  
2 spacecraft. The spacecraft took pictures of the ground as  
3 it reentered and once the spacecraft was picked up, we would  
4 use the photography that was on board to reconstruct the path  
5 of the spacecraft as it reentered.

6 Q So, in other words, pictures were taken by the  
7 spacecraft itself, is that right?

8 A Right.

9 Q Did you use pictures of the crash site of the --

10 A There were pictures of the crash site that had  
11 been picked up but they had very little influence because  
12 most of our interpretation had been from the photos taken  
13 from the spacecraft.

14 Q Have you ever been asked to give testimony of any  
15 sort, either in the administrative setting or a trial setting?

16 A No.

17 Q Or by deposition of a satellite manner or any other  
18 crash matter?

19 A No.

20 MR. CONNORS: You have to wait until he finishes  
21 his question and then answer, it's easier for her.

22 THE WITNESS: Okay.

2 Q Dr. Welch, who was it that gave you the task and  
3 the parameters of your task involved in that project?

4 A Haight, Gardner's employees, staff.

5 Q Did Mr. Macomber participate in giving you any of  
6 the parameters of your task?

7 A No, he primarily introduced me to the people that  
8 would be doing that.

9 Q So, he physically introduced you to somebody at  
10 Haight, Gardner?

11 A Yes, because he and I were associates of a previous  
12 employer.

13 Q And who was that?

14 A Earth Satellite Corporation.

15 Q What were his tasks at Earth Satellite?

16 A Project work in contracts on research and interpre-  
17 tation. He was in the Washington Office and I never worked  
18 specifically on the same project he did. I was in the  
19 Berkeley Office.

20 Q During those times that you have spoken with Mr.  
21 Macomber about your task in the entire CSA incident, has he  
22 ever given to you a statement as to how the accident occurred?

23 A We discussed it early on, I wanted to know what the

1 aspects of it were, such as what caused the crash. He  
2 indicated that a cargo door had blown off which damaged the  
3 control cables and ultimately forced the airplane down but  
4 that was the greatest detail that he gave me. I recall it  
5 from news reports at the time.

6 Q Did he give you any facts or details about the  
7 speed of the aircraft or the location, the soil type, or  
8 anything of that nature?

9 A No.

10 Q I presume that at sometime you have had -- at least  
11 had access to that type of information?

12 A That's correct, in these reports you have seen  
13 here, the Air Force Reports, the Collateral Report, the  
14 ones that I have access to.

15 Q Do you recall precisely when it was that the task  
16 was outlined to you by the people at Haight, Gardner?

17 A December 15th.

18 Q 1981?

19 A 1981.

20 Q And that was done in their offices here in  
21 Washington; is that correct?

22 A Yes.

23 Q And do you recall who it was that was giving you

1 this task?

2 A John Connors.

3 Q Was that the first time you had had any contact  
4 with Haight, Gardner or John or anybody from Haight,  
5 Gardner?

6 A Yes.

7 Q So, is that the time when Mr. Macomber first  
8 introduced you to Haight, Gardner?

9 A Yes.

10 Q And you had had no communications from them or to  
11 them prior to December 15th?

12 A No, that's correct.

13 Q Now, at the time, Mr. Connors outlined your task,  
14 did he give you any factual information -- I'm sure he's  
15 already advised you that certain communications between he  
16 as your attorney and you as the expert witness are privi-  
17 leged and I just want to say that I am not trying to go  
18 behind that but I am entitled to find out any factual infor-  
19 mation he might have related to you.

20 A He related what was in these reports and suggested  
21 I read these reports to get the factual information on the  
22 crash but he wanted me to formulate my own analysis and  
23 opinion from the photography, which I have been able to do.

1 Q Now, were there any other people with you at the  
2 time of this meeting?

3 A And which meeting was that?

4 Q The December 15th one.

5 A Yes, Bob Macomber was there, he introduced me;  
6 John Connors was there; Tom Almy was there. I met Carroll  
7 Dubuc later on in the day. Captain Ashby Elmore from the  
8 Air Force was there, Gary Allen was there, who is the  
9 counsel for the Justice Department; Major Parr, who I pre-  
10 sume is Air Force counsel, was there, and two gentlemen from  
11 the CIA were there; I don't recall their names, one was  
12 counsel and the other was, as I understand, a photo inter-  
13 preter. I believe that's all that were there that morning.

14 Q Did Mr. Macomber stay for the entire meeting?

15 A Yes.

16 Q You don't recall the names of the CIA people that  
17 were there?

18 A No.

19 Q Did anyone tell you why they were there? What  
20 their purpose for being there was?

21 A No, I didn't understand that. In fact, I thought  
22 I was asked to sit in on a meeting primarily that was going  
23 on to see if other photography might be made available and I

1 think that's the time this photography we are talking about  
2 from the Air Force was discussed and the experience I have  
3 had in the past tells me that there are files of government  
4 photography available and if you ask people to find them,  
5 frequently you can come up with additional photography and  
6 that's how that meeting turned out. We asked Captain Elmore  
7 to do a search and he did that. I think the CIA was there  
8 primarily for the same question, to see if they might have  
9 some data that could be used for an investigation.

10 Q Were the CIA people there to find out from someone  
11 else if there was additional material available or were the  
12 CIA people there to tell other people that additional photo-  
13 graphic material was available?

14 MR. CONNORS: I will object to the form of the  
15 question. I don't think the alternatives are exhausted.

16 MR. McMANUS: And if the alternatives aren't  
17 exhausted --

18 THE WITNESS: I don't know why they were there.  
19 They never told. They ask a lot of questions but they  
20 don't answer any. As I said, one man was an attorney and  
21 the other one was a photo interpreter and it was my under-  
22 standing that they were there for us to ask if they might  
23 produce some photography. They declined to do that and

1 asked a few questions and left.

2 Q They declined to produce --

3 A They declined to even look for any. I don't know  
4 why, again, I don't have the reason for that. I don't think  
5 they thought they had anything that would be helpful or  
6 something to that effect and that doesn't imply that they  
7 have any but they are very close about their data for any  
8 uses other than their very own.

9 Q Now, at this time, were the aerial photographs  
10 that we previously talked about, the April 1 and April 12  
11 photographs -- were they shown or discussed at that time?

12 A No, let me explain how that works. There is a  
13 computer system that lists an inventory of photography that's  
14 available on a global basis and when somebody wants to find  
15 out what is available, he comes up with a geographical  
16 coordinate, a point on the ground, which is a distance from  
17 that, mileage or site of this point and a date envelope, two  
18 weeks either side of a point or one side of a point or on a  
19 specific day and he goes into the computer which the govern-  
20 ment has and asks if any of that photography is available  
21 and the computer will print out a list of the coverage dates.  
22 It doesn't list any details as to what it shows or the  
23 quality of the items, so once the information is available

1 on a computer printout, it is saying, yes, there is photo-  
2 graphy on such and such a day of that coordinate then what  
3 one has to do is request to look at that film and then some-  
4 body who has access to it in this case Captain Elmore, can  
5 go look at the film and say yes it shows the area I want,  
6 there aren't clouds covering it or whatever else may be the  
7 problem, but at that time the Captain did not have any idea  
8 whether data were available and secondly, whether it could  
9 be released because it's all classified. The data that he  
10 has access to in that part of the world is classified. One  
11 can do the same thing for civil photography here in the  
12 United States. One can call a number of sources such as the  
13 U. S. Geological Survey in Sioux Falls and say I want to  
14 know what photography is available around these coordinates,  
15 around these dates and a computer printout will come out.  
16 It's a standard procedure. In other words, if it's unclassi-  
17 fied, and it's in the Geological Survey, anyone can go look  
18 at it. If it's classified, then it's very difficult to have  
19 access to it.

1 Q Now, did the two C.I.A. people, did they stay  
2 at this meeting the whole time you were there?

3 A No.

4 Q So, after they were asked what you have already  
5 stated, they were asked, they said no and left; is that  
6 correct?

7 A That's correct.

8 Q And why was Captain Elmore there again, your  
9 understanding as to why he was there?

10 A My understanding was he was there to respond to  
11 a request for a search to see if photography was available.  
12 As I recall, I asked Bob Macomber early on if anyone  
13 had asked the Air Force for additional photography -- I  
14 don't know the details of who got invited to that meeting  
15 and what reasons were given for them to be there. As I  
16 say, I showed up the morning of the meeting, the meeting  
17 was called, and I was just a part of it.

18 I think counsel could answer that questions if  
19 it's appropriate.

20 MR. CONNORS: I have no objection to stating  
21 that in response to that very question, we advised  
22 Mr. Allen, and he took it upon himself to see if there was,  
23 in fact, any other source that hadn't been tapped, and

1 that's the genesis of that meeting, so they could be  
2 given the information on the coordinates and what type  
3 of photography was, and to ask them if, in fact, it could  
4 be determined or whether or not they could be declassified,  
5 and that is the initial genesis, I guess, at my request to  
6 Mr. Allen, in response to my own understanding of the  
7 source that might not have been determined before.

8 BY MR. McMANUS:

9 Q So Captain Elmore had something to do with the  
10 storage or maintenance of photographs, or had access to  
11 them, and he was there for either you or Mr. Allen or  
12 Dr. Welch, to give information to for him to go back and  
13 see if there were photographs; is that correct; is that  
14 why he was there?

15 MR. CONNORS: Yes. He was an Air Force  
16 representative, just like the C.I.A. was invited, and  
17 the C.I.A. lawyer who did most of the talking did say  
18 that they would go back to the general counsel's office  
19 and see what their position was going to be, and what  
20 about where we left with them, because Captain Elmore, as  
21 you have seen, had the benefit of getting the materials.  
22 That's what we understood existed.

23 THE WITNESS: It's a standard approach.

1 MR. CONNORS: There is no question on the  
2 record. I don't mind generating that. I think that's  
3 perfectly obvious that that's what we were inquiring.

4 BY MR. McMANUS:

5 Q Have you had any contact with Captain Elmore  
6 since that December 15th meeting?

7 A Yes. He came over yesterday.

8 MR. CONNORS: He was in our office Thursday, I  
9 believe.

10 THE WITNESS: Thursday, which was yesterday,  
11 primarily to see if I might have any questions that he  
12 could answer regarding the photography which was just  
13 produced, and --

14 BY MR. McMANUS:

15 Q That is the April 1 and April 12 photograph?

16 A Yes.

17 Q Did you have questions for him?

18 A No, nothing technical, just thanked him for  
19 giving me the photography, and I did ask him if any other  
20 dates were available than the April 1st, prior to the  
21 crash scene, because the April 1st photography is very  
22 poor quality, highly degraded for some reason. I assume  
23 it's clouds or something, and he indicated that his inquiry

1 of the computer covered the two-week period, and there  
2 was nothing else available during that time period.

3 Q How about the period between the 1st and the  
4 12th?

5 A That's what I said, there were no other  
6 photography available two weeks either side of the 4th,  
7 is the way he queried the computer, and that was the only  
8 dates that photography was available.

9 Q Well, did he tell you that he went through the  
10 procedure that you have previously described of giving the  
11 geographic coordinates with the distances and the dates to  
12 this computer and then asking if there were any around?

13 A Yes.

14 Q Who operates the computer? What branch of the  
15 government?

16 A I believe it's the D.I.A., which is Defense  
17 Intelligence Administration. They are the repository for  
18 the photography that he has access to.

19 Q Now, did he say that photography was only  
20 available for April 1 and April 12, and that there were  
21 no pictures at all for the two-week period prior to the  
22 4th of April and subsequent to the 4th of April; or did  
23 he tell you that those were the only photos that had been

1 declassified?

2 A The answer is affirmative to your first question.  
3 Those were the only ones available according to the  
4 computer printout.

5 Q And does this computer, to your knowledge, list  
6 both classified and declassified material?

7 A I don't know the answer to that.

8 Q Do you recall how long this meeting of the 15th  
9 lasted?

10 A An hour and a half.

11 Q Were any photos or movies shown or displayed  
12 at this meeting?

13 A Sometime during that day that movie was shown,  
14 the color film; and I don't recall whether it was during  
15 the time of that meeting or -- I believe it was, but I  
16 could be wrong. At least part of the people may have sat  
17 through that movie, perhaps my counsel can clarify that  
18 question.

19 MR. CONNORS: The movie was shown, I think,  
20 several times that day, and I do not recall exactly when.  
21 Everybody got a chance to see it that day.

22 BY MR. McMANUS:

23 Q Do you recall how long the movie was?

1 A Perhaps 15 minutes.

2 Q The reason I ask you that is because more than  
3 one movie has been provided by the government, and  
4 Mr. Connors is ready to tell me that I know that one of  
5 the shorter movies included the longer movie; I just  
6 wanted to find out from you, as a witness.

7 A I think it's a 15-minute film. I could be 18  
8 or 14, somewhere in that ballpark.

9 MR. CONNORS: Do you want to know which one it  
10 was?

11 MR. McMANUS: If you want to tell me.

12 MR. CONNORS: For the record, it is what we now  
13 refer to as the MAC film, that's all caps, M-A-C.

14 BY MR. McMANUS:

15 Q Now, were any photographs shown to you at that  
16 time?

17 A Yes. You can imagine I, as a photo interpreter,  
18 was very interested in seeing photography so, not  
19 necessarily during the time when the people were in the  
20 meeting, because we had other matters to consider, but I  
21 had access to photos during that day, the 15th, and then I  
22 stayed there three days, 15th, 16th, and 17th.

23 Q Do you recall how many pictures you looked at?

1 Obviously I am not asking you precisely, I --

2 A I guess more than 50 and less than 100.

3 Q Were you advised that there were more than 100  
4 photographs that had been produced in conjunction with  
5 this litigation?

6 A No, I wasn't told how many there were. There  
7 was a box or two of photographs that I was shown, and  
8 there was probably close to a 100 photos, some relevant  
9 and some not.

10 Q Were these photos black and white or color  
11 or a mixture?

12 A Mixture.

13 Q Do you recall, were they identified to you in  
14 any way by such references to Walker or Traynor or  
15 anything like that?

16 A In all cases, they were referred to the source  
17 that they came from, Walker or Traynor.

18 Q Do you recall the sources besides Walker --

19 A Walker, Traynor, Piper -- then I saw some  
20 newspaper take-outs; I believe there may have been a few  
21 others, I don't remember all of the exact names.

22 Q What do you mean by "newspaper take-outs?"

23 A Well, there was some photos that apparently had

1      been taken by a newspaper photographer or perhaps taken  
2      by the Air Force and given to a newspaper that had some  
3      pictures of children strapped into seats, that sort of  
4      thing.

5      Q      Was this the only time you met with a group of  
6      people in conjunction with your work on this project?

7      A      As an organized group, yes. I have met with  
8      John Connors, Tom Almy, and Carroll Dubuc at other times,  
9      but John and I have worked together primarily.

10     Q      Have you met with a Mr. Atkins?

11     A      Yes.

12     Q      And when was that?

13     A      That was the night before last. He showed us  
14     his slides that he had brought down and explained how he  
15     prepared them; that's the only time I have met him.

16     Q      Have you ever done any work similar to the work  
17     that he does, computer enhancement of photographs?

18     MR. CONNORS: Objection. I don't think that  
19     limits or accurately characterizes all that Mr. Atkins does.

20     MR. McMANUS: I didn't mean for it to.

21     MR. CONNORS: I realize that, but --

22     BY MR. McMANUS:

23     Q      Have you done any computer enhancement or laser

enhancement of pictures in conjunction with your work on  
this project?

A. No.

Q. Have you used any of Mr. Atkins' photos?

A. I have seen them but haven't used them.

Q. Now, as part of your work on this project, you  
were given some materials to review; is that correct, sir?

A. Yes.

Q. Could you tell me precisely what materials you  
have been given and if there were some that you were  
given but have not reviewed, I would like you to designate  
and separate those out.

A. All right. I was allowed to use photographs,  
many of which I see here, that are included in my report,  
black and white, color, paper prints. We had some  
transparancies made from the 16 millimeter film that I  
had requested that we take out. When we talk about  
stereoscopic viewing, we need photos taken from two different  
camera stations, looking at the same scene, and we can do  
that with movies. So we did. I would be happy to show  
you those, if you would be interested in those.

I had access to documents such as I have brought  
here, and I will try and list those and the ones I have

1 read. The report by Captain Traynor, the Air Force  
2 Accident Investigation Report, this one here (indicating),  
3 which I presume is quite abbreviated and the Collateral  
4 Report, which is quite abbreviated, Dr. Moraine's report  
5 and depositions that he has given, and I don't recall the  
6 exact -- let's see. It seemed to be October or November  
7 deposition, or something like that, October or November  
8 depositions of Dr. Moraine. I have seen a report by  
9 John Edwards, which I have a copy of here, D-1298, and  
10 then a subsequent letter written on December 14th, a very --  
11 two or three-page letter, in which he was clarifying some  
12 measurements that Dr. Moraine had used in his analysis;  
13 and I have read those reports I have just described in  
14 detail.

15 Now, the reports I have scanned include  
16 Dr. Starke's report, Dr. Starke's--- I suppose it would  
17 be the testimony in the Marchetti or Schneider trial, I  
18 don't recall which. The Lievermann testimony, the Neal  
19 testimony, and the -- what's the gal's name that begins  
20 with a "G", Goffinet, that one. I have just scanned  
21 those. I haven't read them in detail.

22 Q Do you understand Goffinet and Neal to be the  
23 same person?

1       A. I guess they are. That was her maiden name,  
2       wasn't it?

3       Q.     Correct.

4       A. All right. So, let's see. Leivermann, Neal,  
5       Starke -- I believe that's all I have seen. Again, I have  
6       just scanned those. My primary interest was in those  
7       I brought with me here.

8       Q.     Have you seen the video depositions of either  
9       Christie Leivermann and Harriet Goffinet Neal?

10      A.    No.

11      Q.     Were you aware --

12      MR. CONNORS: Wait a minute. You mean has he  
13      seen the video tape, or has he read the transcript?

14      MR. McMANUS: The videotape, I presume that what  
15      you were telling me about the depositions was you did  
16      mean to include transcripts of the video depositions?

17      THE WITNESS: Let me try and described -- I saw  
18      what sounded to me was at a court trial, because it was an  
19      examination and cross-examination. I suppose that was  
20      a transcript of the testimony in court, a written one. I  
21      have not seen the video.

22      BY MR. McMANUS:

23      Q.     Do you recall the date, because both of those

1 people have both been deposed and testified at trial.

2 A Was it Marchetti and Schneider trials --

3 MR. CONNORS: My recollection is he was given  
4 the Leivermann transcript and videotape and we had the  
5 Neal, and he received that, but I'm not sure he received  
6 a transcript of that.

7 BY MR. McMANUS:

8 Q Now, Dr. Welch, you mentioned -- excuse me.  
9 Is that all of the materials?

10 A Yes, right.

11 Q You mentioned reports by Starks and Traynor. Did  
12 you mean reports such as the type of report that you have  
13 prepared, or do you mean statements?

14 A No. Sworn statement by Traynor is the one I  
15 have seen here.

16 Q And the date of the transcript is --

17 A 15 May '75. I have seen that one, and I have  
18 scanned his -- is it a court testimony that Traynor had  
19 where he was examined by Mr. Lewis; is that accurate?

20 Q Well, he again has been both deposed on a couple  
21 of occasions and has testified in court at trials in various  
22 of these cases.

23 A I don't recall the exact document I scanned.

1 Again, it was not one I spent any time with. And what  
2 was the other question regarding the report --

3 Q Starkes?

4 A It was the transcript of his testimony. It  
5 was during another court trial.

6 Q Were you shown a report prepared by a  
7 Dr. Turnbow?

8 A No.

9 Q A Dr. Gauna, G-A-U-M-E?

10 A No.

11 Q Dr. Turner?

12 A No.

13 Q Now, did you rely on those materials in your  
14 examination of the photos and the rendering of the opinion  
15 you have stated in your report?

16 A I don't think rely is an accurate word. I  
17 consulted them and in some cases even disagreed with the  
18 statements, so I -- they did not influence me to the  
19 point where I had to come up with the same agreement that  
20 they had, because my observation was based on photo  
21 interpretation and where the photos indicated something  
22 to me, that was what I put down as my opinion; and if it  
23 disagreed with the others, it did not influence me.

1 Q Do you recall whom you disagreed with?

2 A Specifically, John Edwards, who has said there  
3 was a certain amount of wreckage left on the east side  
4 of the Saigon River at the initial touchdown; and I came  
5 up with a different amount of wreckage. The landing  
6 gear particularly was a question. The number of tires  
7 that I have been able to count in the photography on the  
8 east side was the type of disagreement I am talking about.

9 Q Have you, by the way, been given any of  
10 Mr. Edwards' deposition testimony to read?

11 A No.

12 Q Anyone else that you can recall you disagreed  
13 with or any other facts?

14 A The measurements that Dr. Moraine came up with  
15 are somewhat different based primarily because he used  
16 a different calibration for a tire diameter and the length  
17 of the troop compartment, which I think is the source of  
18 his errors. Subjectively, we probably measured the same  
19 point on the ground, but in his calibration of that distance,  
20 he has used a number that he had drawn from a place that  
21 was a little different, and I can point out that type of  
22 an error.

23 Q That's not in your report?

1 A Yes.

2 Q An error --

3 A 3.75 versus 4.02 feet.

4 Q So that is the source of the difference between  
5 your measurements and Dr. Moraine's; is that correct?

6 A When we talk about measurements, yes.

7 Q And the source that you used for the tire  
8 diameter measurements came from Mr. Edwards; is that  
9 correct?

10 A That's correct.

11 Q So in that respect, you did rely on John Edwards?

12 A Yes, based on, for example, he said that this  
13 4.02 dimension is commercially available in tire catalogs,  
14 and I did not consult a tire catalog. I took his word  
15 as in his report here.

16 MR. CONNORS: Before we proceed here, I don't  
17 want any confusion. If you are talking about areas of  
18 disagreement with Mr. Edwards or anything in his report,  
19 you better be very specific about it, because he hasn't  
20 said he disagrees with Mr. Edwards' findings or anything  
21 else, and that better, you know, I don't want any generali-  
22 zations.

23 MR. McMANUS: I presume when I ask the question,

what disagreements do you have, that Dr. Welch understood  
me to be asking for a comprehensive listing of anything  
he might disagree with with anybody. So, if it's just  
measurements of Dr. Moraine, that he disagrees with, then  
he's told me that. If there is anything else about  
Dr. Moraine that he disagreed with, I expect that he would  
tell me that and the same thing with Mr. Edwards or any  
of the other sources that he has reviewed.

MR. CONNORS: Well, he just told you that --  
your discussion was limited to the area of measurement.  
He -- you didn't ask him if he disagreed in any other  
areas. I think you better make that clear.

MR. McMANUS: Well, I asked -- please understand  
my question is comprehensive in nature.

THE WITNESS: Okay. Shall I go on?

MR. McMANUS: Are you going to tell me about  
things other than specifically stated in your report?

THE WITNESS: No, my report indicates the points  
that I considered for disagreement and that involved the  
measurements, that involved the existence or non-existence  
of fire and fuel spillage, the alleged airborne nature  
of the troop compartment, and other parts of the aircraft  
at specific times and the abrupt stopping against a hill-like

1 structure. Those are detailed in my report, and there are  
2 not other areas that I have considered in detail, primarily  
3 because they didn't appear to be a part of my task in  
4 this case.

5 BY MR. McMANUS:

6 Q Besides working on this project, have you ever  
7 had any contact with Mr. Edwards before?

8 A No.

9 Q You are aware that he is an employee of  
10 Lockheed?

11 A Yes.

12 Q Do you know in what capacity he is employed by  
13 Lockheed?

14 A Yes. Generically, he is a C-5 engineer and an  
15 engineer that was involved in the design and construction  
16 of the aircraft.

17 Q And you know he is not an aeronautical engineer?

18 A No, I didn't know that.

19 Q Who gave you the task of critiquing Dr. Moraine's  
20 report?

21 A Haight Gardner, through John Connors.

22 Q How was that put to you?

23 A I was asked to evaluate Dr. Moraine's reports to

1 verify the measurements and findings that he made, and  
2 if I had any difference of opinion or difference of  
3 measurements, that I was to detail those and describe  
4 them.

5 Q And these are described in your report; is that  
6 correct?

7 A Yes.

8 Q And you have told me that you have read the  
9 deposition of Dr. Moraine; is that correct?

10 A Yes.

11 Q The depositions of Dr. Moraine. Did you read  
12 two?

13 A Yes.

14 Q So you know how he went about taking the  
15 measurements and the reference points, and things of that  
16 nature?

17 A Yes.

18 Q Is that about the same method and procedure  
19 that you used?

20 A Yes.

21 Q Is it fair to say that the only difference in  
22 the final measurements, then, is because of the difference  
23 in the reference points -- and I am referring specifically

1 to the tire, yours being --

2 A Yes, but I should -- go ahead, finish your  
3 question.

4 Q -- yours being the tire diameter of 4.02, and  
5 his being 3.75?

6 MR. CONNORS: Objection. He also stated there  
7 was a difference in the troop compartment length.

8 MR. McMANUS: Well, that's understood and  
9 that's in his report. I don't think he said that yet.

10 THE WITNESS: He also made some statements  
11 regarding the behavior of the air frame and took  
12 measurements from those points, which means he started at  
13 one point and ended up at another point, and I would not  
14 necessarily agree with all of those. But that, again, is  
15 for the subjective analysis photography. But the  
16 calibrations that he used, starting with a known dimension  
17 was different than the one that I would have used, and I  
18 would expect his numbers to come up differently if he would  
19 have used the same calibrations that I did.

20 BY MR. McMANUS:

21 Q You would expect his numbers to be different,  
22 even if he used the same calibrations?

23 A To be different from his previous numbers.

1       Q     Is it your feeling that if he used your  
2     calibration reference point, that his figures would be the  
3     same as yours?

4       A     Yes. In fact, I have made some calculations on  
5     his report using the figures that John Edwards came up  
6     with, and we're all in the same ballpark as far as  
7     dimensions of point "A" to point "B" are concerned.

8       Q     Doctor, you did prepare a report that was  
9     submitted to Haight Gardner, I presume; is that correct?

10      A     Yes.

11      Q     Were there any previous drafts of that report?

12      A     There was a draft prepared; I handwrote a  
13     draft, which was typed and then I edited that, and this  
14     is the document that came from that.

15            MR. McMANUS: I would call for the production of  
16     the original handwriting draft.

17            THE WITNESS: I don't keep drafts like that. I  
18     have thrown them out. I don't presume you people have  
19     kept it --

20            MR. CONNORS: Not if our cleaning services are  
21     doing their job.

22            THE WITNESS: Once I am satisfied that my draft  
23     has been accurately typed, I check the numbers and

1 dimensions that I put down, and I don't save them.

2 MR. McMANUS: I would call for the production  
3 of any previous drafts to this report that are still in  
4 existence.

5 BY MR. McMANUS:

6 Q Is that your final report, by the way, the one  
7 that --

8 A Yes.

9 Q -- your counsel furnished to us as of January 7th?

10 A Yes.

11 Q Have you completed your work on this project  
12 as far as anyone told you?

13 A No. I presume I may be asked to testify in a  
14 court appearance, and I would expect to review my report  
15 and the photographs before I would go into court, so I  
16 could be refreshed on what my findings are. The task I  
17 was given to do in preparing this report has been completed,  
18 to this point, but I would expect to be asked to do, again,  
19 prepare for a court appearance.

20 Q Have you been asked to testify?

21 A Not officially. I have been told that that  
22 might be required. I suppose it depends on whether the  
23 court, the judge, might agree with my appearance, and you

1 people might agree with my appearance; but I have been  
2 indicated that might be a possibility.

3 Q. Have you been advised that the trial in which  
4 you would be appearing, if you do appear to give  
5 testimony, is beginning Monday, January 11th?

6 A. Yes.

7 MR. CONNORS: Do you want to take a break?  
8 Could we take a couple minutes --

9 MR. McMANUS: Sure.

10 (Brief recess.)

11 BY MR. McMANUS:

12 Q. Doctor, I have in front of me a document of 25  
13 typewritten pages, the title of which is, "Assessment of  
14 Saigon C5A SN68-213 Crash Site, April 4, 1975." And  
15 under that, Robin I. Welch, Ph.D., and that the date,  
16 December 16th, 1982, and I presume you mean that to be  
17 1981?

18 A. Yes. Could we change that with pen and correct  
19 that?

20 Q. Sure.

21 A. That's a typo.

22 Q. January 8th, 1982?

23 A. Right.

2 Q And attached to that, at least to what I have,  
3 are 39 pages of photocopies of pictures. Is that the  
4 report that you have prepared in conjunction with your  
5 project for Lockheed?

6 A For Haught Gardner, yes.

7 Q You understand that it's being used for  
8 Lockheed's defense?

9 A Yes.

10 Q Now, the first page of this report lists, in part,  
11 your objectives; is that correct? I guess it lists a  
12 number of your objectives.

13 A Right.

14 Q And there are descriptions of crash events and  
15 assessments of the report of Dr. Stanley Moraine?

16 A Yes.

17 Q And you -- I believe you have already told us  
18 before that your assessment is based on a review of  
19 photographs and a motion picture, as well as the reports  
20 that you have read, and previously described to us; is  
21 that correct?

22 A Yes.

23 Q Have you seen or do you know of any computer  
24 simulation of the accident or the accident sequence?

1 A No.

2 Q And you were asked to verify the report of  
3 Dr. Moraine by Mr. Connors; is that correct?

4 A Yes.

5 Q On page two of your report, you have listed the  
6 data used. Now, were there any photographs that you  
7 considered and rejected which are not attached to your  
8 report?

9 MR. CONNORS: I will object. Can you define  
10 "considered" as to what you mean by that?

11 BY MR. McMANUS:

12 Q That you looked at.

13 A I would rather put it in a positive -- from the  
14 photographs I had available, I selected these to illustrate  
15 the points that my analysis was making so that meant that  
16 many were not used. As far as rejecting, they are just  
17 left out because these either showed them better or I  
18 wasn't trying to make a point with them.

19 Q Do you have any way of listing or enumerating  
20 those photos that you did look at but did not use for  
21 whatever reason you did not use them?

22 A No.

23 Q What collateral charts did you use?

1       A     Documents that were available in the Air Force  
2     report and some of these other reports that may have had  
3     charts in them, which were not really relevant but I  
4     considered them in interpreting. For example, the altitude  
5     pressure charts and all of that — they were available  
6     but I didn't feel that that was in my area of concern.

7       Q     Which diagrams?

8       A     Primarily the crash diagram that I presume  
9     was an Air Force crash diagram that was prepared, the only  
10    copy of happen to have with me is this one that  
11    Dr. Moraine has in the middle of his report that shows  
12    the crash diagram. These diagrams here (indicating) of the  
13    aircraft dimensions, that are reproduced, and then that  
14    diagram (indicating).

15                    MR. CONNORS: The record should reflect that  
16    Dr. Welch is referring to the diagrams contained in  
17    Dr. Moraine's report.

18                    BY MR. McMANUS:

19       Q     Those diagrams are marked as Plaintiff's Exhibit  
20    3-H, Defendant's Exhibit 1217, Defendant's Exhibit 1216 —

21       A     And he's got a crash diagram that I have seen  
22    before. I will go through page by page to find it.

23                    That one there (indicating).

MR. CONNORS: Figure 16 of Dr. Moraine's report is the item which Dr. Welch has just indicated.

THE WITNESS: I referred to that in mine, I said which exhibits I used.

MR. McMANUS: And, figure 16 of Dr. Moraine's report is also a Defendant's Exhibit, D-9.

Are there any others?

THE WITNESS: These listed here, D-1216, which you just mentioned, D-1217, D-1307, and D1320, are used for all measurements and descriptions of aircraft components.

BY MR. McMANUS:

Q So, those are the diagrams and maps that are referred to in Sections 2.1 of your report?

A Yes.

Q And you also have listed reports. Are those the reports that you have previously testified?

A Yes.

Q And all of that was considered by you in rendering the opinions that are set forth in this report; is that correct?

A Yes.

Q Now, on page two of your report, you have referenced

consultation with experts with knowledge of the local terrain and vegetation types. Who were those people?

A. Well, that would have been John Edwards in that case who had been at the site over there, and had waded through the mud and waded through the vegetation, and with knowledge of the local terrain, and vegetation types over there.

Q. And you spoke with Mr. Edwards about that?

A. Yes.

Q. And what did he tell you?

A. Well, I asked him if the ground was soft as typical of a rice paddy, and he said yes, it was; in fact, he had sunk up to his ankles or a little higher several times in the mud. And I asked him whether the vegetation appeared to have been burned or not, and he indicated there was no evidence he saw around the troop compartment, which I asked him, or there had been a fire, and he was not able to give an opinion on fuel spillage, because he was there several days later and did not see any indication of fuel spillage at that time. He wasn't there immediately after the crash.

Q. Did he indicate to you he had been there before the crash?

A. No, I wasn't aware that he had been.

Q. Okay. Whom did you get information from concerning the before conditions of the crash site?

A. Well, that was from my own experience over years of study of rice areas. I have studied rice throughout the world, wet lands, areas of sand, silt, gravel deposits. So, it would be my own experience there and the people that I may have worked with in the past on these projects, professors of various types --

Q. Did you consult with any of these people specifically about this project?

A. No.

Q. What has been the extent of your experience with rice fields?

A. I started out in 1958 investigating rice interpretation on aerial photography, and then have conducted, at various times being assigned with projects in which rice was of concern for inventory and yield assessments, and something related to the productivity of soils that rice is grown on in the United States, including California, Texas, Louisiana, and then in Southeast Asia, which includes Vietnam, Thailand, the Philippine Islands, and Burma, and some in China.

Q. Did this involve direct studies of soil and types of soil?

A. Only as indicated by plants and productivity of the soil, no specific soil typing as such, because the plants reveal the productivity of the soil by whether they are vigorous or not vigorous in growth.

Q. Have you ever done any studies concerning layering of the soil, things like that? Development of a rice field?

A. No. I am aware of the technology, but I have not done any studies of such.

Q. As far as the conditions of the ground at the crash site, then, you relied on the information provided to you by Mr. Edwards; is that correct?

MR. CONNORS: Objection. Go ahead, you can answer.

THE WITNESS: And the photography, to my knowledge, and to my eye, the photography reveals what the conditions are on the ground, and I verify those by asking Mr. Edwards what his experience was on the site.

BY MR. McMANUS:

Q. And turning to page three of your report, the measurements and configurations of the plane and its components, were provided to you by Mr. Edwards and you relied

on him for that information; is that correct?

A. And these documents that I list here, which I have just shown copies of here.

Q. Okay. You have stated that rice had been freshly planted at the time of the accident. What's the source of that information?

A. My interpretation of the photos of the site and my experience with looking at newly planted rice.

Q. And you mentioned that standing water completely surrounded the troop compartment?

A. Yes.

Q. Could you pick out for me which of your photos --

A. Photos numbered 24-A and 24-B, we can set up our stereoscope. I think you need to see these under a stereoscope. Is this the best light we have? Why don't we set these up for the stereoscope. Would you want to take a minute to do that?

MR. McMANUS: Sure. I would like you to do that for me.

THE WITNESS: If you have a little desk lamp, that would help, like a tinsor lamp.

MR. McMANUS: I'll see. There is -- will this help if you pull this out?

THE WITNESS: Possibly.

MR. CONNORS: Perhaps you could ask him to explain this before you try to --

MR. McMANUS: I intend to do that. I am looking for a lamp for him right now.

What was the last thing that was on there?

Question: "Could you pick out for me which of your photos --"

BY MR. McMANUS:

Q Now, Doctor, we have photos 24-A and 24-B under the stereoscop that you have brought with you today. Could you describe for me what is a stereoscope and how does it work?

A Yes. The stereoscope is a viewing instrument that permits a person to see photos in three-dimensional imaging, the way that is done is we have two photographs taken of the same object from different camera stations, much the same as your human eye would look at the same scene from two different camera stations; in this case, two-and-a-quarter inches apart generally. The stereo-photos used in photo interpretation, we use one photograph taken over the target, and then the aircraft is moved along and take the next photograph over the target. Generally,

the photographs overlap each other by sixty percent, and the next one overlaps by sixty percent. So, every image is shown three times, or at least twice, and then we take these photographs and put them down so that our left eye looks at one photo and the right eye looks at the other, and it's just as if you were up in the airplane looking down with your eyes from perhaps a half a mile apart. If this is the spacing that the airplane flies along.

In these cases, these were taken out of a movie film in which the helicopter was circling around the ground scene and the movie continually was taking pictures at 24 frames a second or whatever the spacing was.

We have selected out of that movie film about every 30 frames, approximately, or it would be between 20, 30, or 40 frames, and that permits us, looking out the side of the aircraft, to see three-dimensional viewing, because one picture was taken here and the other over there.

Now, we cannot do this if we are flying straightforward. We could not get the 3-D effect because your camera stations don't vary that much that way, but if you are looking out the side of the aircraft, then

we have what is called an eye separation that -- that's what we've used here. It's a rather standard photo interpretation technique used to permit us to see things in 3-D.

Now, you will notice there was an exaggeration of -- things look taller than they really are. What we have done is taken your two-and-a-quarter eye base, and stretched it out here, probably a hundred and fifty feet, and therefore it stretches the 3-D effect. It permits us to see more detail than we would see otherwise with the naked human eye.

Q Now, Doctor, those photos taken from the frames of the movie, aren't special in any way, are they?

A No. We call them movie take-outs.

Q So, there is nothing that has to be done to the photo to enable you to get the three-D effect when looking through the stereoscope?

A That's correct. And an experienced person, such as I am, can hold them up even without a stereoscope the left eye looks at the left picture and the right eye looks at the right picture -- we call it naked eye stereo, but you don't have that magnification that you would like this, but that's the only difference. That's

about a two-power magnification in this device here.

Q Now, you don't need the stereoscope to look at those two pictures, 24-A and 24-B, and see standing water around the troop compartment; do you?

A No, but let me modify that by saying we always see better if we have the two vantage points, because we can see things in their spacial relationship and something that might appear to be a shadow on a single photo can very well be water if you have the two together or something that appears to be water on a single photo may, in fact, be a shadow which is dark on the two photos together in stereo. So, it does remove the ambiguities. It permits us to see the ground the way it really is because single photos have many ambiguities -- you just can't figure what is there, but the stereo permits us to see it.

Q But in those two, you can clearly see standing water around the troop compartment?

A I was just saying that one might confuse a shadow for water or water for a shadow, and this particular scene, because water is dark and shadows are dark, but with the two together, it is possible to separate one from the other just by their spacial relationship.

Q But that might only have to do with the amount of water, isn't that correct? I mean, I can see water around the base of the troop compartment just by looking at those pictures individually. You don't dispute that, do you?

A No.

Q Which other photos have you used the stereoscope with in giving any of the explanations listed in your report?

A I used additional movie take-outs. As you see here, this is of the flight deck.

Q Which numbers are those, sir?

A That would be number 25 and 26 for a similar type interpretation -- standing water, vegetation conditions. I have also used 20 -- I am sorry. 30 and 31, the flight deck. Occasionally, we can use photographs that were taken for the coverage that happened to be taken from two different camera stations, for our photo interpretation. Generally, somebody is specifically taking photos for stereo viewing and wants to be very careful about the alignment of the camera and the distance from the target that each photo was taken. Some of these were not -- most of them were not taken with

stereo viewing in mind, but it happens we can use some of them in stereo. It does a number of things. It permits us to see the spatial relationship and to see the depth of something, as I talked about. It also removes background noise that might be grain of the film, but the grain is going to be different on two photos; the information is going to be the same on the two photos. It is far more accurate in details and I would say a powerful tool, to use stereo viewing instead of just single photo viewing.

Q But those three sets that you have given me are the only three that you have used?

A No. The only one I have ever used in my report, but I interpreted others in writing my report, but they don't show additional information over what's visible in these. In other words, anything I needed to prove a point or to describe a point, I included the photos in stereo for them.

Q So, in other words, other photos that you might have looked at with the stereoscope did not show any more information through the stereoscope than they did just looking at them with the naked eye?

A No, I wouldn't say that. I find my

interpretation is faster and more accurate and therefore I would say easier to do it in stereo interpretation. For example, there is one that can be used in stereo.

Q What number are you referring to?

A Number 27, and there is one that I did not include in the report which can be used in stereo with that, and that shows very nicely the ground traces on the ground that we talked about.

Q Can you demonstrate that to me?

A I don't have the other print with me, because I didn't include it in the report.

Q All right. Can you describe to me, then, what it demonstrated, it's different from what I can see with the naked eye on that picture?

A It permits us to see the ground trace of the sliding of the troop compartment and the flight deck with greater detail, with greater certainty, than on a single print. And any of the features that reveal a ground trace, the disrupted vegetation, the spots of water, and perhaps some of the debris that was left there on the ground.

MR. CONNORS: For clarification, you have really been addressing just these photographs here, in terms of what was viewed in stereo. You haven't addressed the recent

production of any others. That is a different situation and I want to be clear on that.

THE WITNESS: The Air Force --

MR. CONNORS: The Air Force -- I want this to be a complete record.

MR. McMANUS: Well, he's already explained --

THE WITNESS: The Air Force photos, if in stereo, can also be used in the same fashion.

BY MR. McMANUS:

Q. And have you looked at this in stereo, the Air Force photos?

A. Yes, I have.

Q. And what does that reveal to you?

A. Essentially, the same thing that is revealed in these photographs, in stereo.

Q. Could you state for me as specifically as you can your opinion concerning the ground marks that you've been discussing?

A. The ground marks that I presume you say were made by the sliding of the aircraft, is that what you are talking about?

Q. Well, that's your opinion. I presume that there are ground marks demonstrated in those photos of which you

are of the opinion were made by some parts of the aircraft?

A Yes.

Q Okay.

A What I have done in my interpretation of the ground marks is to start with photography that shows the initial touchdown point of the aircraft, both on the east side and the west side of the river, and then based on the diagrams showing the dimensions of the aircraft, the width of the fuselage, the separation, the spacing of the engine, the spacing of the landing gear tires and such, and to measure the distance that I have seen on the photographs, which I would consider as being candidates to be a scrap or a scrape on the ground, and trace those along the flight path with features that would have made them, such as the trailing of the fuselage, side of the fuselage, the engines, the tires, and see if the distances were the same as they would have been in the diagram. And where I have found that to be the case, I have attributed those scrapes or scratches to the air frame as contrasted to being a natural feature, such as an irrigation drainage ditch or some natural topographic indentation.

In all cases, I did not refer only on a single

photograph, but I took the same measurements and same observations on a number of photos, and where I could see the three dimensional stereoscopic viewing, I used two adjacent photos to do that, and that tends to remove ambiguities that might otherwise be attributed to some other feature.

Q Is it -- excuse me. I didn't realize --

A I was going to say such as a blemish on a photograph, a piece of dirt that was on the enlarging table that one might say it was a piece of aircraft wreckage, but if it is there on two photographs in the same place, you would say it's something on the ground versus a scratch on the film.

MBK:  
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Q Is it your opinion that there is a continuous pattern of disruption from the initial point of touchdown on the west side of the Saigon River to the termination point of both the troop compartment and flight deck?

A Yes.

Q And is it your opinion that that is an unbroken line?

A Yes.

Q Now, doctor, in your report you have made some statements as to why you believe that many of the passengers and the crew of the C-1A survived. You are aware, aren't you, sir, that dozens of people died in this crash?

A Yes.

Q Do you think that anyone that was in the troop compartment during the course of the crash was injured?

A I'd have to look at that from two points: one as a photo interpreter -- I cannot see anything in the photos that would give me an opinion of it that I can see in reading the reports of people that were there and survived the crash, they're reports of people that have been made either injured or not, is the only basis on which I could make that statement.

Q You have read in Mr. Edwards' report that it's his

opinion that the environment of the troop compartment was not hazardous to anyone's health; is that correct?

MR. CONNORS: Objection, that is a mischaracterization of his report and his testimony.

THE WITNESS: I think --

MR. CONNORS: I think, in fact, I think I am going to instruct him not to answer that one as phrased. If you want to rephrase it to the subject matter.

MR. McMANUS: Can I have Mr. Edwards' report?

(The report referred to was proffered to counsel.)

BY MR. McMANUS:

Q Doctor, I refer you to page 12 of Mr. Edwards' report, the next to the last paragraph which reads as follows, "The preponderance of evidence leads to a reasonable engineering conclusion that the occupants of this aircraft were not harmed by the G loads and neither the rapid decompression or the impact with the ground". Did you see that, sir?

A Yes.

Q Do you agree with that?

MR. CONNORS: Objection, I don't think it's ever been indicated he has any basis or was given any task to assess those factors. He can answer, if he can.

THE WITNESS: Well, my observation of the troop compartment is that it is in good shape, it is intact as far as the floor and the walls are concerned. There is no holes punched in it, apparently it didn't turn over or slip end for end. It slid along the ground. What went on inside the compartment, I have no way of knowing because I only see these pictures in their stationary condition, standing still, but in looking at the integrity of the troop compartment, it looks to be integral, that is, it hasn't been broken or have a hole punched in it or apparently tipped over, and, in fact, is a very solid piece of material based on my photo observation.

BY MR. McMANUS:

Q Do you agree with that statement of Mr. Edwards' in his report?

A The way he states it, preponderance of the evidence would mean he -- looking at the information that would be available now, such as the photographs, leads to a reasonable engineering conclusion which would lead to the integrity of the hardware. That the occupants were not harmed, I think that's again, not possible to tell from the photography what the G loads were inside the compartment and whether the occupants may or may not have been harmed in this case by

either the rapid decompression or the impact with the ground. It's just not possible for me to tell.

Q So, you can neither agree or disagree, is that what you are telling me?

A Yes, other than what I said based on the viewed hardware sitting on the ground and the information I have that people survived and were able to walk away from it, that it was not damaged to the point where the people were all severely injured in it. I don't want to get out of my field. I think you are aware of that.

Q So, is what you are telling me, then, sir, that you just can't make an opinion concerning the -- you can't render an opinion concerning injuries to those inside the troop compartment?

A That's correct, let's put it this way: I could see with the integrity of the device that everyone could have walked away from it. Beyond that, I don't know what might have happened, because, again, the device is integral.

Q Do you know that there were infant children, among others, located in the troop compartment?

A Yes.

Q And do you know that after the crash they were removed from the troop compartment and the vast majority of

them were removed alive?

A. Yes.

Q. Do you have any opinion as to whether or not those children were injured?

MR. CONNORS: Objection, as I have said before, it really hasn't been offered in this area. He can answer with what knowledge he has, what facts.

THE WITNESS: I can base the answer to that only on the written testimony I have seen because I haven't discussed with anybody who would have knowledge of that and the fact that the statement says that the children -- most were passed out in good condition, some of them even slept through it, would be the only basis I would have to answer that question and I would not find that in disagreement with my observation of the piece of hardware that I have sitting there in the photograph.

BY MR. McMANUS:

Q. Do you have any knowledge of what type of injuries were sustained by anybody in the troop compartment?

A. From what I read in the report, yes.

Q. What is that knowledge?

A. I recall three injuries specifically: I think they said one woman was killed by a broken neck; one child

was apparently stangled by a string around the neck, and one woman had a clavical, collar bone, broken. That's the only injuries I am aware of.

MR. CONNORS: I just want the record to reflect he was certainly not offered for that testimony nor provided with the full realm of the documentation which exists in that area which is not within his area of expertise.

BY MR. McMANUS:

Q. Would it make any difference to you if there were more injuries?

A. As to what?

Q. As to -- if you were made aware of more injuries, would that in any way enable you to make an opinion about injuries?

A. Well, I would rather not be cast in the role to begin with, to make such an opinion because I am a photo interpretist and not a human physiologist.

Q. Now, Mr. Edwards has stated in his report that it's his opinion that the average G load involved in the crash of a C5-A is 1.6. Are you aware of that from your reading of his report?

MR. CONNORS: Note my objection again to asking the witness questions in areas he has not asked to address, nor

have we tried to establish any competency in -- competency for he to do that type of calculation. You can answer the question to the extent that you can.

THE WITNESS: My observation of the ground trace is there was no point along the ground trace after the touchdown on the west side where the -- where there was a definite sudden decelleration indicated by gauges in the ground. My observation was a nearly uniform sliding of the compartment along the ground and I say that because the ground was very soft and had there been an abrupt decelleration which would have changed those average G forces, there would have been definite gauging in the ground and we can see that because a feature such as a landing gear bounced along and left craters in the ground as it went. The group compartment and flight deck slid leaving a relatively uniform scrape mark. Had that thing come down in any way with the mass involved, in my opinion, I would have been able to see a sizable gauge. I did not see any of those.

BY MR. McMANUS:

Q Well, you do talk about force in your report, isn't that correct?

A Force only from the viewpoint of a photo interpreter that talks about the force that caused the mark on

the ground, not a physicist or an engineer.

Q Well, do you disagree with Mr. Edwards' figure of  
1.6 --

MR. CONNORS: Same objection I noted before. He  
can answer it to the extent he knows.

THE WITNESS: Well, I would agree that I would  
think an average number would be reasonable and accurate for  
the forces involved because I don't see any point that it  
would have said, yes, but at this point, you would have had  
an increase in the G forces.

BY MR. McMANUS:

Q Would you agree that materials slide easier and  
faster over a slick surface as opposed to a dry surface?

A Yes, I would but I'd modify that by saying it  
was soft as we had here and if there were jagged edges, they  
would tend to snag in the soil and modify that smooth slide.

Q Doctor, could you turn to page eight of your  
report?

A Got it.

Q Do you see in the second paragraph where you have  
put in a measurement value on the first levee?

A Yes.

Q Was that the measurement that you did yourself by

looking at the photographs or was that a figure that was given to you by someone else?

A No, that was the measurement that I made and an observation from years of experience in rice areas.

Q So it's a combination of both. Looking, measuring, from the photographs and backing it up or confirming it with --

A -- with my experience.

Q -- with your own experience. Could you explain to me the procedure that you used to measure that?

A There is a tire visible in the photo number 11 that stands sort of on its side, that's not the right one. (Indicating). I'm sorry -- photo number 13, it's on the other side of the levee. It stands on its side and in looking at that tire and estimating that to be four feet in diameter, that the levees that we are talking about are approximately two feet, or a little bit less than that, commonly rice field are.

Q If you can turn to page nine, you talk about the sink rate of the aircraft. I believe you had already told me you are not an aeronautical engineer; is that correct, sir?

A Right.

Q So, your determinations of the sink rate are just

based upon your photo interpretations; is that correct?

A Yes, and, of course, I am a pilot so I know how to calculate the rate of decent.

Q Did you actually make calculations in reaching these figures?

A As reported in my report, I measured height and distances and then through an aeromatic calculation, determined the range of sink rates or rate of decent.

Q Do you have those calculations written down anywhere?

A I doubt if I wrote them down in detail because that's the kind of thing I do on the calculator and just carry on through with it. I have some rough notes. Those, I don't believe, I wrote down. Those just stay in the calculator and come on up, even on my notes and --

Q Well, before I make copies of them, would you describe what they are?

A Okay, these are my --

Q Let me back up on that. Let me make copies then we can go over them.

A Okay.

Q Are these all of your notes or --

A That's it.

Q -- either in your previous case or in anything else?

L That's the total of my calculations.

(The documents referred to were marked as Deposition Exhibit Nos. 1 and 2 for identification.)

BY MR. McMANUS:

Q Doctor, I would like to show you copies of your notes which have been marked Welch deposition Exhibit No. 1 and go through these and describe them for me.

L These are the working notes which I made measurements and calculations of distances by standard photogrammetric techniques of my observations on the aerial photographs.

Q Can you identify which of these notes refer to which calculation?

L Only as they are marked on these sheets here. They were not in any way meant to be included as part of my report and, therefore, in many cases, they are just longhand relationships, ratios, that one has to go through in order to make a calculation.

MR. CONNORS: For the record, can we just indicate that there were six pages in his notes. I assume you made

copies of both sides of these three pages. That's three pages both sides, six pages.

BY MR. McMANUS:

Q And none of these calculations reflect calculations you made concerning the sink rate of the airplane as reflected on page nine of your report; is that correct?

A Those are explained in enough detail that one could just go through and make the same calculations, step by step. Arithmetic is what I put in the reports.

Q Now, doctor, you understand that if asked to testify, you will be asked to give your opinion with a reasonable degree of scientific photogrammetric certainty, do you not?

A Yes.

Q Now, there are some -- actually, there are several places in your report where you use words such as, appears possible, and other such comments. When you use the word, for example, on the bottom of page nine, it appears possible that the nose gear with four tires across first contacted the ground, are you in any way stating that that's an opinion with a reasonable degree of scientific or otherwise certainty?

A Well, it's -- if you read on, it says as evidenced

by the slight rolling marks, three or four tires between the main gear tire marks. So, the possibility relates, therefore, to the evidence that I see on the photograph and I have included that illustration as --

Q Well, you go on to say that these marks could have been made by other structural members, what I am asking is do you have an opinion with a reasonable scientific or photogrammetric certainty as to whether or not it was the nose gear or other -- as opposed to other structural members?

A No, that's my implication in listing it that way that they could have been made.

Q Now, if you go back up to the top paragraph on page nine, do you see where you state, assuming the horizontal distance between levees one and two to be approximately 225 feet, did you make that measurement yourself?

A Yes.

Q So that measurement is based on your own work and not that of anyone else?

A Based on my own work, that's correct.

Q Could you turn to page 13. Do you see the last sentence in the last paragraph on that page beginning with the flight height from that point to touchdown and going on --

A Yes.

Q Do you see where you state it was possibly not over 50 to 70 feet above ground?

A Yes.

Q Is that a statement with reasonable scientific certainty?

A Yes.

Q Would you turn to page 14. In the first paragraph under number 3.3.2, what side of Saigon River, see that heading?

A Um-hmm.

Q The last sentence in that paragraph is, as the aircraft moves forward, it was slowed in its progress by parts that dug into the moist, soft soil and were torn loose?

A Yes.

Q Do you have an opinion as to which parts slowed the progress and which were torn loose?

A Yes, those that would have been on the belly of the airplane in contact with the ground because that's where they were located.

Q What parts are located on the belly of this aircraft?

A The tin, the metal structures that would have been constructed as part of the airplane, the remnants of the

landing gear that would still have been on the airplane --

Q Were there pieces still on the -- pieces of landing gear still attached to the aircraft at this point?

A We found photography on the west side of the river that shows pieces of the landing gear over there, yes. I should say that was an editorial we. I was the one that did the interpretation, forgive me, I am meaning myself in this case.

Q And it is your opinion, sir, that the troop compartment came to its final rest in nearly perfect alignment from the intitial touchdown of the airplane?

A Yes.

Q And you based that on your own observation of the photographs and the movies, the movie.

A The one photograph alone showed that and I will tell you which one that is. It is photograph number 17. The figure number 17. One can sight down the flight track and see the troop compartment only slightly off that flight track and very slightly turned from the -- from the final stopping point.

Q So figure 17 is the one you rely on for that?

A Yes.

Q Dr. Welch, do you know how much a single engine on

the CS-A weighed?

A. No.

Q. Do you know how much a single wing weighed?

A. No.

Q. Do you know how much the troop compartment weighed?

A. No.

Q. The empennage?

A. No.

Q. The flight deck?

A. No.

Q. Is it your opinion that there -- strike that, please.

Do you have an opinion as to whether or not there was any fuel spillage in connection with the crash of the CS-A?

A. Yes.

Q. Could you state that opinion for me?

A. Based on my observation of the photography taken within perhaps an hour after the crash, and I say that because the fire, a fire, was still burning in the wing area, I would estimate that there was fuel spilled in the area where the wing landed. I did not detect any other place where there had been a fire started that would have been

attributed to the crash and would, therefore, have indicated fuel spillage, fuel being a source of fuel for a fire. Except in the wing area and that, again, is based on a number of photographic observations, photos taken immediately after the crash, within an hour, perhaps two, at the most.

Q. Do you have an opinion concerning the discoloration of the vegetation around the various parts of the aircraft that remained after the crash?

A. Yes.

Q. And what is that opinion?

A. My opinion is that the discoloration of the vegetation is not a function of the C5-A crash in question. My feeling is that the vegetation that is brown had been brown for a number of weeks because I see some green grass growing up through it as if that vegetation was dead from some other source and I base this on the photography that was taken, again, within an hour of the crash, approximately an hour after the crash, where vegetation could not have turned color that quickly by a fuel spill. The individual blades of grass and the leaves of the plants that are there are still intact; had there been a fire, they would surely have been burned and not be observable, and, therefore,

the browning that I see was not a function of the spilling of fuel in that short a period of time, that is, within an hour or two after the spill would have occurred.

Q Could that browning of the vegetation have been caused by perhaps a fire ball of some sort, associated with the crash?

A No, I see no evidence of any indication of any fire and particularly, something you would describe as a fire ball because, again, I see very delicate pieces of grass that are brown and unburned and any fire at all would have consumed those quickly and there is no indication of those being consumed anywhere around either the troop compartment or the flight deck and yet, we do see evidence of that consuming up in the wing area. There was a very intense fire in the wing area where the individual blades of grass were consumed, it's just black ash remaining.

Q Is it your opinion, then, that apart from the burning wing, there was no fire associated with the crash of the C5-A?

A That's correct.

Q Now, you mentioned you have based your opinion in part on the photos that were taken one to two hours after the crash; is that correct, sir?

A Yes.

Q How do you know the photos were taken within the two hours after the crash?

A I used two indicators for that: one is the fire was still burning in the area that I identified as the burning wing area because I saw remnants of wing and, two, I looked at the cloud pattern that was visible in all of the photos around that time, even though the fire may not have shown in that particular scene, the sky conditions had high cirrus and cirrostratus clouds at the time and we can see those cloud patterns repeating. Photographs taken on other days showed different cloud patterns and cumulus ones. One other factor is the presence of numerous helicopters in the area so even if the fire was not visible, we can see numerous, I mean six to twelve, helicopters on the ground and it is our understanding that that occurred that first day, to have that many helicopters there.

Q Do you know when photos 24A and 24B were taken?

A Those were taken out from the movie. Those were taken on April 6th, based on the title blocks that was photographed during the time the movie was made.

Q That was two days after the crash?

A Two days after the crash.

MR. McMANUS: We are almost through if you will just bear with me.

MR. CONNORS: I don't want you to feel constrained --

MR. McMANUS: Well, it has been a long day.

MR. CONNORS: As long as it is your decision.

MR. McMANUS: I appreciate that.

BY MR. McMANUS:

Q Now, doctor, in your report you have stated that it is possible to trace the continuous slide of both the troop compartment and the flight deck, back to the point of separation by drawing a line; is that correct?

A Yes.

Q Is it your opinion that there is a continuous, unbroken disturbance of the ground from the point where you say the wing broke off to the final resting place in both the troop compartment and the flight deck?

A I'd like to answer that in this way: there are places where the ground disturbance is very minimal because the troop compartment sliding along had what I call outriggers, that is, parts of fuselage side were acting as a skid device or sliding device for this and, therefore, there was very little cutting into the soil. In those areas

I did observe vegetation missing so that there had been a nearly uniform stand of grass in the area and as the troop compartment slid forward, if it didn't sink into the soil, it still mowed the grass and I did this based on the color photography and when I say continuous trace, I can see that disruption of vegetation that occurred and, again, that would have been the same afternoon of the crash which I looked at with the idea that perhaps people had run back and forth enough to kill the vegetation but within just a matter of hours after the crash or less, I don't feel that people could have trampled it to that degree, particularly when most of the activity was just helicopters in there and so my observation would be that part of the trace I see was disrupted vegetation and only very slight soil indications.

Q In your report on page 20, you have stated that the distance from the river bank to the forward end of the troop compartment was measured to be 2,161 feet; is that correct, sir?

A Yes.

Q Is that your measurement?

A That's my measurement.

Q And by the forward end of the troop compartment, do you mean the edge farthest away from the river or the

edge closest to the river?

A. Farthest away from the river.

Q. Doctor, I believe that you previously testified that the wing structure burned considerably during the crash sequence; is that correct, sir?

A. Yes.

Q. And I believe that in your report you indicated that the wing landed in a dry area; is that correct?

A. Yes. Well, it wasn't in standing water but there was water around it in several locations which is visible on the photographs.

Q. Now, on the next to the last page of your report, page 24, you have described the troop compartment as moving in a "planing" fashion. What do you mean by that, sir?

A. Planing over the ground as something that is planing on a surface, as when planes over water or planes over a flat surface, a planing effect, in contact with the ground or the water surface.

Q. In complete contact with the ground?

A. Right, much as a water skier or a boat planes on top of water, in this case the troop compartment was planing along the surface.

Q. All right. Doctor, I would like to ask you --

first of all, have you seen the enhanced photographs produced by Mr. Atkins?

A. Yes.

MR. CONNORS: I will object to that characterization of enhanced without any further explanation. I think that's a term that Mr. Atkins went into great detail on and I don't want there to be any confusion about, just for the record, he was very specific about "enhancement" being the contrast to stretching which he did.

MR. McMANUS: You don't deny that he characterized it as being enhanced, do you?

MR. CONNORS: Yes, I don't think he ever used the term.

MR. McMANUS: Okay. I think he did but that's not important.

MR. CONNORS: I think he -- visually optimized I believe, was the phrase.

MR. McMANUS: You had always previously described to me that these photos were enhanced either by lazar or some operation and if you want, I will give you the letter and I will show you it although I don't intend to ask this witness --

MR. CONNORS: That's the danger of a novice

trying to express something that he should not say.

BY MR. McMANUS:

Q And I understand, Dr. Welch, that you did not use any of those photographs in rendering your opinion; is that correct?

A That is correct.

Q Sir, I would like to show you one of the photos that was described yesterday by Mr. Atkins and its photo designated with the number 340 in the upper lefthand corner.

MR. CONNORS: For the record, the number 340 refers to the Walker series number.

BY MR. McMANUS:

Q And I'd like to ask you, Dr. Welch, if you can identify these parallel lines that run across the field in that photo.

A Who made them and how?

Q What they are.

A They are associated with the growing of rice in that area, would be my observation and they are typically water control levees. That is, they control the depth of water within each of those strips, this area has not been farmed in perhaps two or three years because of the natural vegetation that has grown up in here but the traces of these

remnant levees are all still visible.

MR. CONNORS: For the record, the parallel lines that Mr. McManus was referring to are above the center line and on the far left side of the picture just beside what has been described as the north south trending walkway; is that correct?

MR. McMANUS: That is correct and they run at an angle to the north south walkway and there are also some similar type levees which run in a horizontal direction in the lower lefthand quadrant of this photo designated as 340.

THE WITNESS: You can see these on figures number 29 very faintly and they appear to be low spots or drains in here because there is standing water in each of them and that would be in the same area if this is the nose gear (indicating) it's about in here, so this photo was taken from about here, looking across these (indicating) and there are remnant indications, remnant agricultural traces, of some kind.

BY MR. McMANUS:

Q. Thank you. Now, are those the levees that are sometimes referred to in your report?

A. No, those that I have shown here are actually

indentations because there is water standing in them. At one time, they may have been levees but commonly, what's done after an area is farmed for a few years in rice, the levees are all knocked back down to ground level and new levees are formed. They need to be put in for one thing for weed control and secondly, they don't have the integrity to hold the water anymore and so they knock them down and rebuild them.

Q Do the levees in this picture, 340, appear to have any standing water in them?

A In a few places, yes. Excuse me, again, levees stand up by definition and the drains are right next to them. So, you don't say levees have water standing in them.

Q So, there are some upward standing levees indicated by this picture; is that correct?

A Not in those cross areas you have talked about, no. The upward standing levee's on the east west footpath there, but the other levees appear to be, as I indicated, on this ground view which looks across the same thing, photo 29, that shows a ground perspective of that scene and you can see, in fact, that they do not stand up. They appear to be, the traces you see there appear to be, little strips of vegetation and slight indentations where water is

standing.

Q All right. Thank you.

Dr. Welch, one last thing. We have, in the photos that were attached to your report, been unable to read the material that is placed on plastic overlays attached to your original photos but we have duplicate just the overlays and I would ask you if you would go through this series of xeroxes and see if that matches up with the plastic overlay information attached to your pictures.

A These are they.

Q Thank you.

MR. McMANUS: That's all the questions I have. That's it.

MR. CONNORS: Thank you. One question on the record.

EXAMINATION BY COUNSEL FOR DEFENDANT/LOCKHEED:

BY MR. CONNORS:

Q Dr. Welch, are the opinions you have expressed here today to a reasonable degree of scientific certainty?

A Yes.

Q And are the opinions expressed in your report, except as qualified, as Mr. McManus has also described previously, to a degree of scientific certainty?

A.

Yes.

MR. CONNORS: Thank you.

(Whereupon, at 5:45 o'clock p.m., the taking of  
the instant deposition ceased.)

I have read the foregoing  
148 pages which contain my  
answers 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.

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Notary Public

My commission expires: \_\_\_\_\_.

CERTIFICATE OF NOTARY PUBLIC

COMMONWEALTH OF VIRGINIA )

)

COUNTY OF ARLINGTON )

)

I, MAIRIM B. KENNELLY, the officer before whom the foregoing deposition was taken, do hereby certify that ROBIN I. WELCH, 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.

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Notary Public in and for the  
Commonwealth of Virginia at Large

My commission expires: \_\_\_\_\_.