

RAS 4616

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

Title: Private Fuel Storage, LLC

Docket Number: 72-22-ISFSI; ASLBP No. 97-732-02-ISFSI

Location: Rockville, Maryland

Date: Tuesday, July 2, 2002

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UNITED STATES OF AMERICA
 NUCLEAR REGULATORY COMMISSION

In the Matter of:)
 PRIVATE FUEL STORAGE, LLC,) Docket No. 72-22
 (Independent Spent Fuel) ASLBP No.
 Storage Installation) 97-732-02-ISFSI
)

ASLBP Hearing Room
 Third Floor
 Two White Flint North Building
 11545 Rockville Pike
 Rockville, Maryland

July 2, 2002

The above-entitled matter came on for hearing,
 pursuant to notice, at 9:00 a.m. before:

MICHAEL C. FARRAR, CHAIRMAN
 Administrative Judge
 U. S. Nuclear Regulatory Commission

DR. JERRY R. KLINE
 Administrative Judge
 U. S. Nuclear Regulatory Commission

DR. PETER S. LAM
 Administrative Judge
 U. S. Nuclear Regulatory Commission

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C-O-N-T-E-N-T-S

WITNESS DIRECT CROSS REDIRECT RECROSS

LT. COL. HUGH HORSTMAN

By Mr. Soper 13329
 By Mr. Gaukler 13447
 By Mr. Turk 13475

Voir Dire by Mr. Gaukler on pages 13248
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Voir Dire by Mr. Turk on pages 13268
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E-X-H-I-B-I-T-S

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>MARK</u>	<u>RECD</u>
<u>State</u>			
220	Barnett video		13293
221	Horstman video		13294
222	Aerial photograph	13308	
223	Analysis of Mishap Reports	13328	13412
<u>Staff</u>			
65	The Great Book of Modern Warplanes	13475	13502

P-R-O-C-E-E-D-I-N-G-S

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9:03 a.m.

CHAIRMAN FARRAR: Good morning, everyone.
I see that everyone is here. We need to get started.

Have the parties had any thoughts since last night about the two videotapes? Mr. Gaukler?

MR. GAUKLER: Yes, we have had a chance to review them. We have some objections, not in terms of surprises, because we now have had a chance to review them. But we do have some substantive objections with respect to them.

CHAIRMAN FARRAR: Okay.

MR. GAUKLER: I can proceed with that.

CHAIRMAN FARRAR: Yes, why don't you? Just before you start, Ms. Marco, what's the staff's position going to be?

MS. MARCO: We don't have any objections, but I would like to hear what the Applicant has to say.

CHAIRMAN FARRAR: Okay, go ahead, Mr. Gaukler.

MR. GAUKLER: With respect to the video of --

CHAIRMAN FARRAR: Colonel Bernard?

MR. GAUKLER: -- Bernard, yes, there's two

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1 factors that the PFS has with aircraft crash
2 calculation, two factors. One is the 90 percent
3 factor, able to avoid; the other one is the 95
4 percent, would avoid in fact. I understand the State
5 to be offering the exhibit with respect to the latter
6 point, the 95 percent factor.

7 CHAIRMAN FARRAR: Is that correct, Mr.
8 Soper?

9 MR. SOPER: I don't think it is limited to
10 that. I think it addresses several things, but --

11 CHAIRMAN FARRAR: Okay, that's fine. I
12 didn't want you to argue yet. I just want Mr. Gaukler
13 to know where we're going.

14 MR. GAUKLER: Let's have him see what he
15 thinks. It would be useful, I think.

16 CHAIRMAN FARRAR: Okay, go ahead, Mr.
17 Soper. Make it clear for what purposes you're
18 offering the tape.

19 MR. SOPER: I think, like every piece of
20 evidence here, I don't think a single piece of
21 evidence necessarily goes to a single point to be
22 made. This whole proceeding has centered around the
23 notion that a pilot, No. 1, is flying some sort of
24 aircraft, which is kind of an unknown to all of us
25 here, having never flown it, and can see out the

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1 window and see something. What is that like?

2 In addition to the familiarity with the
3 aircraft, what it's like to fly it, here is the
4 narrated version of some of the things you have to do
5 when you're flying, how you eject, the center of this
6 whole proceeding, things that can occupy your mind,
7 that might be a challenge to doing some of the other
8 steps that you might consider. It covers the whole
9 gamut, the very heart of knowing about this process of
10 flying an airplane, ejecting, and weather, and I
11 suppose maybe those do primarily go to the notion, can
12 a pilot necessarily miss a site 95 percent of the
13 time.

14 But I wouldn't say it is limited to, for
15 instance, just a calculation of those percentages. I
16 think it goes to a general understanding of what a
17 pilot does, and, most importantly, this hangs on,
18 these percentages hang on the notion of training. I
19 think, as Judge Lam has pointed out, that the basis of
20 the 95 percent always seems to come back to training.

21 This is a training video about the very
22 exercise that is at issue here. So, broadly, I guess
23 you could say those things funnel down and impact on
24 the 95 percent; but I would hate to say anything that
25 could be interpreted as limiting the use of that in

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1 calculating the 95 percent or something to that
2 effect.

3 CHAIRMAN FARRAR: All right, thank you for
4 clarifying that.

5 (Judges confer.)

6 MR. SOPER: I also thought of just one
7 other thing, while they're talking. I think it
8 probably also goes to somewhat rebut the notion that
9 this is just a routine exercise, that people take some
10 steps, and you read a list of things to do out of a
11 book, and this matter of ejection is just routine. It
12 adds some substance to that notion. Maybe it's
13 routine; maybe it's not, but this is really what it is
14 about.

15 MR. GAUKLER: I think that helps me, Your
16 Honor. I guess I was using the 90/95 percent in very
17 broad terms. Ninety percent, are you in control of the
18 plane, able to avoid, and obviously Colonel Bernard
19 was in control of the plane because he was flying it
20 for two-and-a-half minutes. So I was just saying it
21 goes to the second factor: Would he be able to avoid?
22 And I accept counsel's arguments that he wants to
23 argue very broadly with respect to how this would
24 apply to the second factor.

25 That's where my problem comes in. He

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1 claims that this applies to the second factor in many
2 different senses, but what we saw yesterday in that
3 video is not representative of flight through Skull
4 Valley. What we saw was a simulation, air-to-ground,
5 air-to-air, combat simulation, involving numerous
6 planes, a very chaotic situation, as one would expect
7 in battle or battle simulation.

8 CHAIRMAN FARRAR: Which would be more
9 relevant if we were dealing with the Utah Test and
10 Training Range than --

11 MR. GAUKLER: Right.

12 CHAIRMAN FARRAR: -- our situation.

13 MR. GAUKLER: In Skull Valley people have
14 testified we're in the routine administrative phase of
15 flight. You're checking out your instruments. You
16 have your wingmen off to one side, and you're flying.
17 You're going to notice much more quickly if something
18 happens to your engine and be able to take steps.
19 You're not going to be diverted or engrossed in all
20 the other activities that were ongoing at the time.
21 For example, Colonel Bernard shot down an F-5 in the
22 action while his engine had failed. Also, one of his
23 wingmen or somebody told him, "Break right," which is
24 a very sharp turn, to avoid an enemy plane. So all of
25 these things were, you would say, part of the

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1 environment shown in the video which would not be
2 representative of Skull Valley at all.

3 So, to the extent they are going to try to
4 argue that this video, what we saw yesterday, is
5 representative of the conditions in Skull Valley, we
6 think it's not. That is the reason we object to it.

7 CHAIRMAN FARRAR: All right, but in terms
8 of the elements of surprise we talked about yesterday,
9 I sense there were -- you're not relying on today, I
10 understand?

11 MR. GAUKLER: That's correct. We have had
12 time to look at it and talked with our experts last
13 night.

14 CHAIRMAN FARRAR: Okay. Just so the
15 record is clear on that, this was a 12-minute safety
16 training video put out by the Air Force, and it was
17 your good fortune to have handy as one of your
18 consultants the former Chief of Safety of the Air
19 Force. So I take it even though there was a surprise
20 element, your people were able to use the evening
21 hours to review it?

22 MR. GAUKLER: One would always like more
23 time, but we had sufficient time to review it, Your
24 Honor.

25 (Laughter.)

1 CHAIRMAN FARRAR: Which was, in fact,
2 different from the time we gave the State to review
3 the crash reports. We gave them time which fit in
4 with the scheduling of the hearing and reviewing those
5 was a more lengthy effort than reviewing the 12-minute
6 tape.

7 Before I hear from the staff, we sensed
8 also yesterday the element of surprise in terms of the
9 code you all have operated under among the lawyers and
10 your sense that, even if this report was not
11 officially released by the Air Force until yesterday,
12 you would have appreciated a call earlier saying this
13 was in the works.

14 MR. GAUKLER: Yes, Your Honor.

15 CHAIRMAN FARRAR: Okay.

16 MR. GAUKLER: Since we introduced Exhibit
17 100, which you heard on the stand yesterday General
18 Jefferson say he was working up to the last second,
19 when we introduced that, we have tried to make an
20 attempt when we have something substantively,
21 significantly new, to advise the State beforehand. It
22 hasn't always worked out, but that is what we
23 certainly have tried to do in order to expedite the
24 hearing.

25 CHAIRMAN FARRAR: One, you're not raising

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1 that today. Two, I'm not sure it rises to the dignity
2 of a legal objection. But, third, we understand why
3 you would feel that way. Let's just leave it at that,
4 without making any ruling. --

5 MR. GAUKLER: Fine, Your Honor.

6 CHAIRMAN FARRAR: -- in that regard.

7 Ms. Marco?

8 MS. MARCO: Well, with respect to the
9 argument that the video is not representative of Skull
10 Valley conditions, I believe we did raise that concern
11 yesterday, and I believe that that's a valid
12 objection, and particularly in a video depiction. So,
13 on that basis, the staff objects.

14 CHAIRMAN FARRAR: Oh, you do object?

15 MS. MARCO: On that basis.

16 CHAIRMAN FARRAR: Okay.

17 MR. SOPER: Could I respond to that, Your
18 Honor?

19 CHAIRMAN FARRAR: Certainly.

20 MR. SOPER: I didn't mean to cut you off
21 there.

22 CHAIRMAN FARRAR: Okay, Ms. Marco, I
23 thought I understood at the beginning you might not be
24 objecting, but I'm --

25 MS. MARCO: Well, I am reminded that we

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1 did take that objection previously, and having heard
2 --

3 MR. SOPER: You're certainly entitled to
4 withdraw your objection.. I don't want you to feel
5 bound by something you did yesterday.

6 (Laughter.)

7 CHAIRMAN FARRAR: Go ahead, Mr. Soper,
8 your response.

9 MR. SOPER: The PFS guidelines and the way
10 they have put this together is that all engine
11 failures are considered to be Skull Valley conditions.
12 After the engine failed and after the pilot disengaged
13 from the combat, and as Mr. Gaukler pointed out, those
14 two-and-a-half minutes of time elapsed there, this is
15 an engine failure with the pilot in control of the
16 aircraft, just like every other engine failure we've
17 looked at.

18 We haven't excluded an engine failure yet
19 in this proceeding based on the fact of anything other
20 than, if it is an engine failure, it is a Skull Valley
21 condition. The pilot's in control, and he has two-
22 and-a-half minutes. The fact that he spends 30
23 seconds finishing his exercise, thinking he's got
24 time, so what? It's an engine failure. It's a Skull
25 Valley condition. An engine can fail for any reason

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1 in any exercise, and that's the reason they are all
2 considered to be Skull Valley conditions. It's simply
3 a random mechanical failure.

4 So whatever you happen to be doing at the
5 time, bombing or whatever, becomes secondary. You're
6 no longer bombing; you're a pilot with a failed
7 aircraft, a failed engine, and you're in control.
8 What happens next?

9 Now if you want to argue that he wasted 30
10 seconds doing something else he might not have, fine.
11 I imagine every case is different. Every one of the
12 cases in Exhibit 59, as you will see, is not a person,
13 a pilot flying through Skull Valley at ordinary
14 conditions. There are ejections on the runway. There
15 are crashes with no ejections. They are simply all
16 engine failures. That is why we're looking at them.
17 This is an engine failure.

18 CHAIRMAN FARRAR: Before we rule on this,
19 what -- oh, go ahead, Mr. Gaukler.

20 MR. GAUKLER: I just wanted to make one
21 point. I want to make one point. That's why I draw
22 at the beginning the distinction from the 90 percent
23 factor to the 95 percent factor, because, in fact,
24 when we looked at, well, engine failure could happen
25 anywhere, that's the comment, we included it in that

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1 sense.

2 Now we're looking at it very specifically
3 in terms of, is this what a pilot who suffers engine
4 failure in Skull Valley does? And that is what they
5 are introducing it for. In that sense, for the
6 reasons I stated, I do not think it represents Skull
7 Valley.

8 I also think that the video speaks for
9 itself, but I think he was engaged in battle much
10 longer than 30 seconds. It was two minutes, and then
11 towards the very end he began to not be engaged in
12 battle tactics and he began to focus in terms of what
13 he should do in terms of dealing with the airplane.

14 CHAIRMAN FARRAR: Before we rule on this
15 one, what is the Applicant's position on the Horstman
16 simulation video?

17 MR. GAUKLER: I have some additional voir
18 dire for Lieutenant Colonel Horstman on that. We have
19 concerns whether it is representative of Skull Valley
20 and other related concerns. Again, we are not arguing
21 surprise, but I do have some additional voir dire on
22 that before I would make my argument.

23 CHAIRMAN FARRAR: Would it help you with
24 that voir dire to have Mr. Soper do what he did with
25 the other one? Mr. Soper, do you want to make a brief

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1 statement of the reasons for which you are introducing
2 this?

3 MR. SOPER: Again, I think, for all
4 information that can be drawn from it, that informs
5 the Board about a pilot flying an F-16 and what he
6 might be able to, or might not be able to, see. In
7 particular, one of the things that I think is very
8 important is that the nose of the aircraft blocks the
9 view in front of the pilot, particularly I think as we
10 saw, and Colonel Horstman pointed out, from 4.2 miles,
11 the nose of the aircraft blocks a site that's in front
12 of it. I think that that's particularly informative.

13 Also, it seems to me the relative size of
14 a ground object -- I mean, how can any of us have any
15 notion? The pilot looks out the window. He's at
16 2,000 feet. He's four miles away from a site. So
17 what does that mean to us? Nothing. It means not a
18 thing. I mean, is it in our field of vision a foot
19 wide or a inch wide? It means nothing. We have heard
20 testimony for weeks, and we know nothing about this.

21 Now we have the opportunity for the first
22 time to see in this video, the simulator, and in an
23 actual pilot ejecting, what this really looks like.
24 Take that away, and we all have different visions in
25 our mind of what this looks like. We know nothing

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1 without some kind of actual reference.

2 I think PFS had the burden to bring
3 forward this kind of evidence. On something of this
4 magnitude, if you want, to change the rules of
5 probability based on a new theory never been tried,
6 they don't even show us what it looks like for a pilot
7 to do this. Unbelievable.

8 We have that opportunity now by documents
9 produced, one by the United States Air Force, the
10 other on Air Force equipment with their supervision.
11 To turn our back on it, I mean, how can we? How can
12 we?

13 JUDGE LAM: Mr. Soper, if one of the
14 principal objectives of the second tape is to
15 demonstrate there is obstruction of visibility due to
16 the nose of the aircraft, would that objective be
17 better demonstrated by a simple geometric argument of
18 using the optical line of sight? Because introducing
19 a simulator video would lead to numerous other
20 uncertainties such as, how is the simulator being
21 programmed, how far is Colonel Horstman digital video
22 filming the simulator console, among many other
23 things?

24 MR. SOPER: Well, I don't think the
25 position of the filming makes any difference. What

1 the screen shows is what the pilot would see, and when
2 you film that screen, of course, it does not change
3 the respective angle. It's not like if you were in
4 your automobile with the hood open and you raised your
5 camera up and down, you would get different amounts of
6 the hood obstructing the road. That's not the case in
7 a simulator because what you're looking at is a
8 picture of the hood up a certain way and a person
9 viewing it from a certain angle. Whatever angle you
10 take a picture of the people at does not choose that
11 respective view.

12 So, if you follow me, Judge Lam, I don't
13 think it makes any difference where you film it from.
14 What the simulator screen shows is what the pilot
15 sees. And we can ask Colonel Horstman to elaborate on
16 that.

17 I think the point is, and he can be cross
18 examined to the satisfaction of all the other parties
19 here to make sure they are satisfied, but the point
20 is, at some angle the nose of the aircraft, which just
21 makes common sense -- I mean, how could it be
22 otherwise? -- the nose of the aircraft, particularly
23 in a glide, as it points up a ways, obscures your
24 vision.

25 JUDGE LAM: Right, that's exactly my

1 point. You don't need that videotape to demonstrate
2 that.

3 MR. SOPER: I think that that's right to
4 demonstrate the principle, but what the simulator does
5 is saying at 2,000 feet and at this speed, and at your
6 ordinary glide angle that you would be in during an
7 ejection, that obstruction happens to take effect
8 around four miles.

9 So it turns out that a plane will glide
10 3.2 miles, as the PFS panel testified yesterday. So,
11 in fact, if the plane is going to glide over three
12 miles after ejection, and from four miles the nose
13 obstructs the view, then it is significant, because at
14 the point of ejection, if you're headed for a target,
15 you won't even see it.

16 So that would not be something you could
17 discern from holding objects up and demonstrating the
18 principle that, when something is in front of you, you
19 can't see it. You would not be able to get the
20 distances of an actual F-16, and at what distance does
21 the geometry of the nose impede the vision of the
22 pilot? You get that specific information from the
23 simulator.

24 JUDGE LAM: I see.

25 (Judges confer.)

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1 CHAIRMAN FARRAR: Mr. Gaukler, why don't
2 you go ahead with your voir dire?

3 MR. GAUKLER: Okay, and then I will come
4 back to many of the points that Mr. Soper raised.

5 CHAIRMAN FARRAR: Right.

6 VOIR DIRE EXAMINATION BY MR. GAUKLER

7 MR. GAUKLER: Good morning, Lieutenant
8 Colonel Horstman. How are you doing this morning?

9 LT. COLONEL HORSTMAN: Good morning.
10 Fine.

11 MR. GAUKLER: What software was used with
12 respect to the simulation that you used?

13 LT. COLONEL HORSTMAN: I stated yesterday
14 I don't know.

15 MR. GAUKLER: Okay. Do you know whether
16 it is for modeling other types of aircraft, say an
17 F-15 or something like that?

18 LT. COLONEL HORSTMAN: That particular
19 one?

20 MR. GAUKLER: Yes.

21 LT. COLONEL HORSTMAN: I don't know. I've
22 never flown the F-15.

23 MR. GAUKLER: But my question was, do you
24 know whether the computer program that was used for
25 your simulation could be used to simulate or be used

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1 for training with respect to other aircraft, such as
2 an F-15, for example?

3 LT. COLONEL HORSTMAN: I don't know.

4 MR. GAUKLER: You don't know whether this
5 program was specifically developed for the F-16 or
6 whether it was a general program that was adapted for
7 the F-16?

8 LT. COLONEL HORSTMAN: It is exclusively
9 an F-16 cockpit. So if you're talking about software
10 or hardware, I don't --

11 MR. GAUKLER: I was talking about
12 software.

13 LT. COLONEL HORSTMAN: Yes, I don't know.

14 MR. GAUKLER: The other thing I was
15 looking at the video that you had, and you were saying
16 that you showed the steer point/refinery going below
17 what you said was the nose of the plane, or I guess
18 another way to say it is the radome of the plane?

19 LT. COLONEL HORSTMAN: It would depend on
20 your seat height.

21 MR. GAUKLER: Okay. So, anyway, you said
22 you saw that go under the nose of the plane in the
23 video?

24 LT. COLONEL HORSTMAN: Yes, just like
25 under the dashboard of a car.

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1 MR. GAUKLER: Yes, and I guess, as far as
2 I could see on there, I didn't really see what I
3 thought was a real model of what I would think of as
4 a nose. I just kind of saw a straight line across the
5 bottom, across the entire video. I didn't get a sense
6 that it really modeled the nose of the F-16.

7 LT. COLONEL HORSTMAN: That's the front of
8 the aircraft. When you look at the front of the
9 aircraft of the F-16 from the outside, it's obviously
10 very pointy. When you're sitting inside the cockpit
11 and the seat at the design eye height to look at the
12 heads-up display, you're within about, oh, an inch of
13 everyone else's what they call the design eye.
14 Because you can't look at the heads-up display from
15 three inches to the left or right or up or down. It
16 occludes. You cannot see it.

17 When you look through the heads-up
18 display, what you are seeing beyond that is
19 essentially the front edge of the dashboard, and below
20 that is the radome. If you raise your seat fully up
21 to the top of the canopy to have your head brushing
22 against it, you can then see basically the nose cone,
23 as you alluded to, but otherwise you see the front of
24 the dashboard, which is what's depicted in the video.

25 MR. GAUKLER: So what you're seeing is not

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1 the steer point or the image of the facility that you
2 used was not going on the nose cone, but it was going
3 below the head of the dashboard?

4 LT. COLONEL HORSTMAN: It is going out of
5 the pilot's field of view, whether it's the dashboard
6 or the nose cone.

7 MR. GAUKLER: What you're saying, I guess
8 my question was, how accurately was it modeling the
9 F-16? That was my question. Because I didn't really
10 see what I would associate as a nose of an airplane
11 when I was looking at the video.

12 LT. COLONEL HORSTMAN: Very accurately.

13 MR. GAUKLER: But how do you know that
14 when you don't know the software that's being used?

15 LT. COLONEL HORSTMAN: Because I flew for
16 seven years in the F-16, and I viewed that as being an
17 accurate depiction.

18 MR. GAUKLER: Now --

19 CHAIRMAN FARRAR: Mr. Gaukler, you're
20 getting at the point, which I tend to share with you,
21 that as we watched the simulation, the target, the
22 supposed chemical plant, was obscured, but you didn't
23 know by what --

24 MR. GAUKLER: Yes.

25 CHAIRMAN FARRAR: It was obscured on the

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1 screen, but we didn't see the nose in front of us.
2 Electronically, it was obscured, but we didn't have a
3 visual image of what we assume you would see
4 sitting --

5 MR. GAUKLER: And my questions went to how
6 accurately was the program really modeling what occurs
7 in fact.

8 LT. COLONEL HORSTMAN: I guess the best
9 way to answer that is to say that the TV screen that
10 you look at, it goes below what you can see in the
11 video, just like you would looking at -- if you could
12 put your head out the window, you would be able to see
13 farther down. However, you have the cockpit mockup --

14 MR. GAUKLER: Which TV screen are you --
15 excuse me.

16 LT. COLONEL HORSTMAN: The picture that
17 you saw of the ground and the oil refinery --

18 MR. GAUKLER: Yes.

19 LT. COLONEL HORSTMAN: -- that's the TV
20 screen in the simulator; the visual presentation that
21 is not the green lines in the HUD, everything else.

22 The cockpit mockup is to scale, and it's
23 precise and it's accurate. It reflects the same
24 cockpit and the same windscreen, dashboard, if you
25 will, that is in the aircraft. So I believe it is a

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1 very accurate representation of where the pilot's view
2 would be restricted by metal.

3 CHAIRMAN FARRAR: But it didn't look to
4 me, and I think to Mr. Gaukler, that the refinery was
5 obscured by the hardware in the plane you were just
6 talking about. It looked like it became obscured by
7 a triangle we couldn't see. In other words, you kind
8 of saw on the screen that here was the representation
9 of the nose or the radome, but that was something
10 different than the cockpit instruments and stuff.

11 LT. COLONEL HORSTMAN: It's black in
12 color, just like the cockpit of the aircraft. This
13 video, for that purpose, might have been better taking
14 it over a blue water or snow perhaps, so that you
15 would have a better refined line. Based on my
16 experience in the airplane and in the simulator, I'm
17 able to tell where you're going to lose your
18 visibility, and that's what I discussed yesterday and
19 pointed out.

20 JUDGE LAM: But you do have the precise
21 configuration of an F-16 in terms of the size of the
22 cockpit, the size of the window, where can a pilot
23 maneuver his head, assuming he's sitting there, and
24 then the length of the nose from where the cockpit is.
25 So the obstruction would be a relatively simple

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1 geometric consideration. Give me an elevation where
2 you are flying. Give me an angle of tilt of the nose.
3 Then you can immediately map out what you could see or
4 could not see from the ground, instead of introducing
5 all these uncertainties as to the simulator software,
6 what are we looking at, et cetera, et cetera.

7 LT. COLONEL HORSTMAN: Is that a question
8 or --

9 JUDGE LAM: We would like to hear your
10 opinion on this.

11 LT. COLONEL HORSTMAN: I suppose you could
12 do that. We would have to use an infinite number of
13 graphs because every air speed and every aircraft
14 configuration changes that. So you would have to
15 start at perhaps a hundred feet, because as we look at
16 all the ejections, they have gone as low as, well,
17 we'll just call it a hundred feet. So every hundred
18 feet up to maybe 5,000 feet and then every air speed,
19 and then once you have an air speed, you have to have
20 whether you are at level flight, descending, climbing,
21 et cetera.

22 JUDGE LAM: But why do you need to
23 introduce air speed into this, Colonel Horstman?

24 LT. COLONEL HORSTMAN: Your Honor, that's
25 why I tried to depict it, because in the first two

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1 examples the aircraft was pointing, the actual
2 fuselage of the aircraft was pointing about a degree
3 and a half above where the aircraft was flying. In a
4 slower air speed, your angle of attack is increased,
5 and the aircraft was pointing 11 degrees higher than
6 the actual flight path. So that you're like a
7 speedboat in the water going slow; you can't see over
8 the bow of the boat. That's why you would have to
9 have an infinite number of those depictions. It would
10 be a 10,000-page booklet.

11 MR. GAUKLER: Can I follow up on the point
12 just made? You were saying the 11 degrees --

13 (Judges confer.)

14 CHAIRMAN FARRAR: Go ahead, Mr. Gaukler.

15 MR. GAUKLER: Yes.

16 You were talking about the 11 degrees of
17 the nose up. That was with the speed at 200 knots,
18 correct?

19 LT. COLONEL HORSTMAN: Approximately 200
20 knots.

21 MR. GAUKLER: So I understood that really
22 didn't simulate engine failure because an engine
23 failure you would be having no engine power, correct,
24 so it's not really the glide --

25 LT. COLONEL HORSTMAN: It precisely

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1 simulates, because the thrust is not relevant. All
2 that is relevant is your angle of attack.

3 MR. GAUKLER: But your engine would not be
4 running if you had failure, correct?

5 LT. COLONEL HORSTMAN: That's got nothing
6 to do with it.

7 MR. GAUKLER: The engine would not be
8 running? You would not be maintaining steady speed at
9 200 knots, would you?

10 LT. COLONEL HORSTMAN: No, that's a
11 snapshot. You would be descending.

12 MR. GAUKLER: Right, you would be
13 descending and be slowing down, right?

14 LT. COLONEL HORSTMAN: No, you wouldn't be
15 slowing down. You're already at 200 knots. You're at
16 the best endurance -- or, I'm sorry, best range air
17 speed.

18 MR. GAUKLER: Well, if you're descending,
19 your nose will be below the horizon, correct?

20 LT. COLONEL HORSTMAN: I'm sorry?

21 MR. GAUKLER: If you're descending, your
22 nose will be below the horizon, correct?

23 LT. COLONEL HORSTMAN: Yes, sir, and I
24 stated that yesterday.

25 CHAIRMAN FARRAR: Wait a minute, Mr.

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1 Gaukler.

2 Colonel Horstman, I'm confused. I thought
3 you took pains to point out that where the aircraft is
4 headed in terms, I guess, of where its center of
5 gravity is going, may be entirely different from where
6 its longitudinal axis is pointed. In other words, you
7 can be nose up, which looks to the casual observer
8 looking at the snapshot, that you're headed up, but in
9 fact you're descending?

10 LT. COLONEL HORSTMAN: Yes, Your Honor,
11 that's correct.

12 CHAIRMAN FARRAR: Okay, I think that's not
13 what you just said in response to Mr. Gaukler's
14 questions.

15 LT. COLONEL HORSTMAN: Yes, sir. It's
16 entirely -- it's a three-dimensional sphere, and it's
17 entirely based on the aircraft angle of attack.

18 CHAIRMAN FARRAR: Right.

19 LT. COLONEL HORSTMAN: And the angle of
20 attack is based on air speed and the g-loading. You
21 could be upside down and that would have nothing to do
22 with the angle of attack of the aircraft. Where the
23 aircraft is pointing and where the aircraft is flying
24 to are two distinctly different points.

25 CHAIRMAN FARRAR: And in response to Mr.

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1 Gaukler's line of inquiry, if you want to be at 200,
2 you keep your -- if you want to stay at 200 knots for
3 as long as possible, you keep the nose up, the plane
4 descends, but you're staying at 200, notwithstanding
5 the absence of thrust because you're trading height
6 for speed?

7 LT. COLONEL HORSTMAN: You're trading
8 energy, yes, sir.

9 CHAIRMAN FARRAR: Energy, okay.

10 LT. COLONEL HORSTMAN: And I guess a
11 better way angular to discuss that is, if the engine
12 is out, the airplane is perfectly flyable. You just
13 no longer have thrust. The angle of attack will be
14 just the same. You will have 11 degrees at 200 knots,
15 based on the configuration yesterday, you will have 11
16 degrees. The airplane will be pointed 11 degrees
17 above where it is actually aimed or where it is flying
18 toward.

19 If you are in a 5-degree descent, then you
20 will maintain 200 knots, and approaching 2,000 feet,
21 you would then begin the ejection as opposed to the
22 gliding maneuver

23 CHAIRMAN FARRAR: But if you didn't eject,
24 or whether or not you eject, the plane can descend all
25 the way to the ground until it crashes maintaining 200

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1 without any thrust?

2 LT. COLONEL HORSTMAN: Oh, yes, sir, or
3 300 or 500.

4 CHAIRMAN FARRAR: Whatever you want it to
5 be?

6 LT. COLONEL HORSTMAN: Whatever the pilot
7 chooses.

8 CHAIRMAN FARRAR: Okay. Go ahead, Mr.
9 Gaukler.

10 LT. COLONEL HORSTMAN: In a couple of the
11 accidents they chose 350 knots, and because of that,
12 they didn't make the runway and they jumped out.
13 So --

14 JUDGE KLINE: Colonel Horstman, if you're
15 done --

16 LT. COLONEL HORSTMAN: Excuse me.

17 JUDGE KLINE: -- I'll weigh in.

18 (Laughter.)

19 I assume that it would be possible for the
20 Air Force to train pilots entirely from written
21 training manuals, if it chose, couldn't it?

22 LT. COLONEL HORSTMAN: Initially, that's
23 how you fly.

24 JUDGE KLINE: Okay. So what additional
25 training benefit is obtained from simulators? I mean,

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1 why does the Air Force bother to use simulators?

2 LT. COLONEL HORSTMAN: I'd defer to the
3 Air Force. I mean, they have literally hundreds of
4 reasons. They spend millions and millions and
5 millions of dollars --

6 JUDGE KLINE: I understand they do. Just
7 give us a few.

8 LT. COLONEL HORSTMAN: Okay. To glide an
9 airplane and land in an emergency airfield cannot shut
10 the engine down in an airplane in flight because you
11 have none left. You have a high probability of
12 crashing. You practice flame-out approaches in this
13 simulator every year. You are evaluated on them every
14 year and required to pass that evaluation to continue
15 flying.

16 There are literally hundreds of
17 emergencies that the F-16 simulator simulates, and
18 they put the pilot through real-time stresses and
19 radio calls, and similar to the things that you heard
20 in the first video yesterday, those kinds of
21 extraneous and external inputs to the pilot, so that
22 the pilot can focus on the task at hand and solve
23 whatever he is presented with, whether it's hydraulic
24 or emergency or a HUD failure is an emergency.

25 JUDGE KLINE: Okay, that's probably enough

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1 examples.

2 It's reasonable to believe then, is it,
3 that in spite of the fact that the simulator differs
4 from reality in certain ways, the Air Force itself
5 still considers them sufficiently valuable to add
6 significantly to the pilot's training?

7 LT. COLONEL HORSTMAN: Yes, sir, that's a
8 true statement.

9 JUDGE KLINE: All right, that's enough.

10 CHAIRMAN FARRAR: Go ahead, Mr. Gaukler.

11 MR. GAUKLER: First of all, I just want to
12 clarify two things. One, in the simulation you were
13 at level power, correct, and maintaining constant
14 altitude as opposed to descending as you would in an
15 accident-type situation?

16 LT. COLONEL HORSTMAN: Not quite, sir. I
17 was at level, relatively level altitude, and my power
18 was constant. There is no such thing as a level power
19 setting.

20 MR. GAUKLER: You were in powered flight,
21 though, as opposed to descending under failed engine
22 conditions? You were in powered flight?

23 LT. COLONEL HORSTMAN: The engine was
24 generating thrust, yes, sir.

25 MR. GAUKLER: Right, and you weren't

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1 descending, correct?

2 LT. COLONEL HORSTMAN: That's correct.

3 MR. GAUKLER: Okay. Also, in this
4 situation you didn't go through any type of zoom that
5 a pilot would do normally in an engine failure-type
6 situation, correct?

7 LT. COLONEL HORSTMAN: No, I did not. I
8 was unable to because the camera was in my right hand.

9 MR. GAUKLER: Because, typically, a pilot
10 with engine failure would zoom, and then you would go
11 up and then you would apex over and point the nose
12 down when you got to the top of the zoom?

13 LT. COLONEL HORSTMAN: When he got to the
14 top of the zoom, and then you would achieve your 200
15 knots.

16 MR. GAUKLER: At the top of the zoom you
17 point the nose down --

18 LT. COLONEL HORSTMAN: That's correct.

19 MR. GAUKLER: -- and then he would glide
20 down, right?

21 LT. COLONEL HORSTMAN: That's correct.

22 MR. GAUKLER: And he would slowly
23 decelerate down? Okay.

24 LT. COLONEL HORSTMAN: Essentially.

25 MR. GAUKLER: Now several other points you

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1 made: One, you were talking about the design eye of
2 the HUD and how you had to be within a certain
3 position on the HUD to see accurately through the
4 design eye, and you said if you are off by a couple of
5 inches, that would throw off the image. That's what
6 I understood you to --

7 LT. COLONEL HORSTMAN: It obscures the
8 image.

9 MR. GAUKLER: Obscures the --

10 LT. COLONEL HORSTMAN: If I would have
11 moved the video camera six inches to the right, you
12 wouldn't have seen any of the green heads-up display
13 information.

14 MR. GAUKLER: But you actually had the
15 video camera somewhere off to your right, because you
16 had it next to your --

17 LT. COLONEL HORSTMAN: No, I was leaning
18 to the left so that I would be able to film it. I
19 made sure that the HUD design eye was correct for the
20 camera. Otherwise --

21 MR. GAUKLER: How did you ensure that?

22 LT. COLONEL HORSTMAN: If you don't see
23 the green heads-up display lines, then you're not at
24 design eye.

25 MR. GAUKLER: Do you have some parallax

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1 between your eye and the camera, I mean?

2 LT. COLONEL HORSTMAN: No. It's not my
3 eye. It's the camera. If you can see the green
4 information depicted on the heads-up display, you have
5 reached the design eye for the aircraft. So where my
6 head was is not relevant. If the HUD video camera was
7 six inches -- if I was sitting straight up and had the
8 camera six inches to the right, you would not have
9 seen any of that green video on the heads-up display.
10 It would have been occluded.

11 MR. GAUKLER: You were not looking through
12 the video camera when you shot the video, correct?

13 LT. COLONEL HORSTMAN: I was.

14 MR. GAUKLER: You were looking through the
15 video camera when you shot? I thought it was next to
16 you on your shoulder while you were --

17 LT. COLONEL HORSTMAN: No. It was a
18 small, little hand-held, and it's got about a 2x3-inch
19 LCD screen to look at.

20 MR. GAUKLER: How many simulations did you
21 run?

22 LT. COLONEL HORSTMAN: Three.

23 MR. GAUKLER: Did you try any other
24 simulations other than these three?

25 LT. COLONEL HORSTMAN: No, I only had 30

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1 minutes.

2 MR. GAUKLER: And how long were you in the
3 simulator?

4 LT. COLONEL HORSTMAN: It took about 10
5 minutes to set up, about two to three minutes each, so
6 probably 25 to 30 minutes.

7 MR. GAUKLER: How long to set up again?

8 LT. COLONEL HORSTMAN: About 10 minutes.
9 He had to reboot it once. So I'm guessing 10 minutes.
10 I used my entire time allocation.

11 MR. GAUKLER: And time allocation was 30
12 minutes?

13 LT. COLONEL HORSTMAN: Yes, sir.

14 MR. GAUKLER: And the simulator ran for
15 how long in that 30 minutes?

16 LT. COLONEL HORSTMAN: I think you saw.
17 I filmed --

18 MR. GAUKLER: Okay. So what we saw was
19 how long the simulator ran, what we actually saw on
20 the video?

21 LT. COLONEL HORSTMAN: Yes, yes. Well,
22 there was probably 10 or 15 seconds of other actual
23 video that I didn't shoot. Just we were trying to
24 find a turn point, for example. We looked at the
25 nuclear plant, and I said that's too small to see. So

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1 trying to set it up properly.

2 MR. GAUKLER: One of the other questions
3 I had: Do you assume that you set the altitude?

4 LT. COLONEL HORSTMAN: I had the simulator
5 operator program in the above-ground-level flight that
6 the simulator was attempting to maintain.

7 MR. GAUKLER: So why did it change during
8 the flight? I didn't understand why it would change
9 if you programmed it.

10 LT. COLONEL HORSTMAN: Because if you're
11 flying level and the ground rises, then you're going
12 to go, say, from 4,000 to 3,900 feet, and then the
13 simulator will correct. So it's not instantaneous.
14 If we would have put it on an altitude MSL hold, it
15 would have flown a more accurate or a more stable, if
16 you will, altitude above sea level. Because you're
17 trying to maintain above-ground level, the aircraft
18 will climb and descend and that will vary slightly, as
19 it does in all terrain-following kind of situations.

20 If you were to fly from this building
21 towards the Smoky Mountains, you would find the
22 aircraft would be climbing and descending after the
23 fact because your radar altimeter is based on
24 historical information which happened just a few feet
25 before, and it's trying to correct from that.

1 MR. GAUKLER: So it wasn't set like using
2 the land terrain or anything like that? You didn't
3 set the altimeter or anything?

4 LT. COLONEL HORSTMAN: No.

5 MR. GAUKLER: Do any engine control --

6 LT. COLONEL HORSTMAN: That's correct.

7 MR. GAUKLER: You just told the simulator
8 to set the altitude?

9 LT. COLONEL HORSTMAN: That's correct.

10 MR. GAUKLER: What was the name of the
11 device you were on? Was it actually a simulator or
12 was it a training device?

13 LT. COLONEL HORSTMAN: The nickname is a
14 UTD.

15 MR. GAUKLER: What does that stand for?

16 LT. COLONEL HORSTMAN: I don't know what
17 the "U" stands for, "Training Device." So "Unit
18 Training Device" or something like that.

19 MR. GAUKLER: Is that something less than
20 a full-fledged simulator?

21 LT. COLONEL HORSTMAN: It's the same
22 simulator that every fighter squadron trains --

23 MR. GAUKLER: Well, do they also have
24 other simulators, more --

25 LT. COLONEL HORSTMAN: Not operationally.

1 MR. GAUKLER: Were there any external
2 stores --

3 LT. COLONEL HORSTMAN: No, and if we would
4 have put external stores, the angle of attack would
5 have been higher. It would have exaggerated that, and
6 I didn't put them on there because I would assume that
7 if a pilot was going to eject, he would have
8 previously jettisoned his stores.

9 MR. GAUKLER: That's what I have, Your
10 Honor.

11 CHAIRMAN FARRAR: Does staff have any voir
12 dire?

13 MR. TURK: We do, Your Honor.

14 CHAIRMAN FARRAR: Go ahead.

15 MR. TURK: Very limited.

16 CHAIRMAN FARRAR: Go ahead.

17 VOIR DIRE EXAMINATION BY MR. TURK

18 MR. TURK: Good morning, Lieutenant
19 Colonel.

20 LT. COLONEL HORSTMAN: Good morning.

21 MR. TURK: The F-16 has probably the best
22 visibility of any fighter in the U.S. Air Force, isn't
23 that correct?

24 LT. COLONEL HORSTMAN: That is correct.

25 MR. TURK: In fact, the canopy of the F-16

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1 provides 360-degrees horizontal viewing, in other
2 words, all around the aircraft?

3 LT. COLONEL HORSTMAN: It does. To see
4 behind you is a contortionist maneuver, but you can
5 see through the canopy behind you.

6 MR. TURK: And it also provides visibility
7 of 195 degrees in the -- I don't know how to describe
8 this. I would say the vertical plane. In other
9 words, take 15 degrees heading down the nose up to
10 horizontal, and then 180 degrees back over the pilot's
11 head to the rear of the aircraft.

12 LT. COLONEL HORSTMAN: I don't know that
13 that -- I've never heard that actual degree used. As
14 Colonel Fly testified, it's about 11 degrees down in
15 the front, and I don't know how far it is in the back.

16 MR. TURK: You don't know if the 11
17 degrees is accurate?

18 LT. COLONEL HORSTMAN: No, I agree with
19 Colonel Fly.

20 MR. TURK: The pilot in the F-16 also sits
21 above the window sill, if you can call it a window
22 sill, correct?

23 LT. COLONEL HORSTMAN: That's correct.

24 MR. TURK: So that his shoulders, for
25 instance, are above where the canopy begins?

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1 LT. COLONEL HORSTMAN: Yes, sir, that's
2 correct.

3 MR. TURK: The canopy begins somewhere
4 below his shoulders and then extends up over and
5 around his head?

6 LT. COLONEL HORSTMAN: Yes.

7 MR. TURK: And his head, of course, is
8 then elevated even more than his shoulders?

9 LT. COLONEL HORSTMAN: Yes, sir.

10 MR. TURK: So that the head is actually
11 near the top of the canopy?

12 LT. COLONEL HORSTMAN: That's correct.

13 MR. TURK: So that the angle of view that
14 the pilot has is really virtually the best view
15 possible as he is looking down the nose of the
16 aircraft, looking in the forward position? He's
17 sitting as high up as he could go virtually?

18 LT. COLONEL HORSTMAN: No, not quite. He
19 could probably raise his seat, I'm guessing, two
20 inches higher, but then you couldn't use the heads-up
21 display.

22 MR. TURK: And if he didn't raise his
23 seat, he could raise his body somewhat? For instance,
24 I wonder if he could crane his neck or his neck
25 upwards to look down, get a better angle of downward

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1 viewing?

2 LT. COLONEL HORSTMAN: I've never heard of
3 that happening. I assume it could.

4 MR. TURK: If he --

5 CHAIRMAN FARRAR: Let me ask, Mr. Turk.

6 MR. TURK: Yes.

7 CHAIRMAN FARRAR: Are you strapped in so
8 tightly that you can't do that or is it just something
9 you don't do?

10 LT. COLONEL HORSTMAN: Well, first,
11 there's no reason to do it. Second, you're strapped
12 in so tightly, and you've got the seat adjusted so the
13 heads-up display works. The goal is to have the pilot
14 as restrained as possible because the aircraft in some
15 maneuvers is extremely violent.

16 CHAIRMAN FARRAR: Okay, thanks.

17 MR. TURK: In your simulation you did not,
18 I think you just indicated you did not lift the
19 pilot's head or lift the seat in order to obtain a
20 better view looking forward down the nose of the
21 plane?

22 LT. COLONEL HORSTMAN: Now, what I
23 attempted to do was, as realistic as I could come up
24 with, and that is using the heads-up display. The
25 heads-up display only works for a very, very small

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1 part of the cockpit, and it's called the design eye.
2 Your seat has to be the correct height, and if you
3 lean too far back, you can't see it as well, either.
4 It's designed specifically for one area in the
5 presentation on the combining glass.

6 MR. TURK: The seat of the F-16 reclines
7 at a 30-degree angle, correct?

8 LT. COLONEL HORSTMAN: That's correct.

9 MR. TURK: In your simulation, you didn't
10 have the pilot strain his body forward so he could get
11 a better view looking down, correct?

12 LT. COLONEL HORSTMAN: As long as you're
13 using the heads-up display, the farther forward you go
14 -- I mean, you can only go a couple of inches, and it
15 doesn't provide you any better viewpoint over the
16 front because the obscuration is the actual, I'll call
17 it the windscreen of the aircraft.

18 MR. TURK: But if a pilot wanted to see
19 the ground, he could move his body in a way to obtain
20 a better view than would be provided if he was only
21 trying to look through the heads-up display?

22 LT. COLONEL HORSTMAN: I don't agree with
23 that.

24 MR. TURK: You think the pilot is locked
25 in a position? He can't move his head either upward

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1 or forward in order to obtain a better view of the
2 ground?

3 LT. COLONEL HORSTMAN: I've never known
4 anybody who would do that. In flying four ships for,
5 you know, a thousand hours, I've never heard of
6 anybody even considering that likelihood.

7 MR. TURK: If a pilot was going to crash,
8 if the engine had failed and he felt he was on the
9 verge of having to eject and he wanted to see where
10 his plane was heading, you don't think he would move
11 his head somewhat in order to obtain the best possible
12 view of the ground?

13 LT. COLONEL HORSTMAN: No, I do not, not
14 at all.

15 MR. TURK: No?

16 LT. COLONEL HORSTMAN: As a matter of
17 fact, the 150 accident reports that we looked at,
18 there's no indication that that ever happened.

19 MR. TURK: Also, in your simulation you
20 did not roll the airplane left or right, correct?

21 LT. COLONEL HORSTMAN: That's correct.

22 MR. TURK: But you could have. If a pilot
23 wanted to see the ground, he could simply rotate the
24 airplane a little bit off its level --

25 LT. COLONEL HORSTMAN: Horizontal axis.

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1 MR. TURK: -- off its horizontal axis,
2 tilt slightly, and look down the one side or the other
3 in order to see the ground directly below or slightly
4 in front of the plane?

5 LT. COLONEL HORSTMAN: No. To look
6 directly below, yes. When you roll into bank, you
7 obscure, generally speaking, more in front of you than
8 you -- you will lose visibility by rolling into bank.

9 MR. TURK: But he doesn't have to bank,
10 does he? He could roll rather than bank?

11 LT. COLONEL HORSTMAN: If you roll, that
12 is bank.

13 MR. TURK: The F-16 is also a unique
14 flying machine in the sense that you don't have to
15 bank in order to roll the plane slightly off its
16 horizontal axis and look down.

17 LT. COLONEL HORSTMAN: That's not true,
18 sir.

19 MR. TURK: That's not true?

20 LT. COLONEL HORSTMAN: No.

21 MR. TURK: Would you be surprised if
22 informative literature on the F-16 takes a different
23 position than what you've just described with respect
24 to whether the plane can be rolled without banking and
25 whether a pilot could look down?

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1 LT. COLONEL HORSTMAN: It's not physically
2 possible. You're reading it incorrectly.

3 MR. TURK: In the simulator for the F-16,
4 isn't it possible for the pilot to move his body from
5 side to side?

6 LT. COLONEL HORSTMAN: Yes.

7 MR. TURK: Is that described as an
8 articulated simulation? Have you heard that phrase
9 before?

10 LT. COLONEL HORSTMAN: In the simulator?

11 MR. TURK: Yes.

12 LT. COLONEL HORSTMAN: I've never heard
13 that phrase before.

14 MR. TURK: And in the simulator the pilot
15 can move his head?

16 LT. COLONEL HORSTMAN: Yes.

17 MR. TURK: In your simulation, however,
18 you did not do that, correct?

19 LT. COLONEL HORSTMAN: No, as I stated, my
20 purpose was to keep the video camera at the design eye
21 of the heads-up display, so that you all could watch
22 the video. And if I didn't keep the video camera
23 there, you all would not have been able to watch that
24 video.

25 MR. TURK: Okay. And as we've indicated

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1 before, you see the ground through the HUD, correct?
2 In other words, you're looking through it and you're
3 seeing the ground ahead of the HUD?

4 LT. COLONEL HORSTMAN: Yes.

5 MR. TURK: It's not that you're seeing the
6 ground in the HUD? You look straight through it as if
7 it's a window glass?

8 LT. COLONEL HORSTMAN: That's correct.

9 MR. TURK: And you look to the side of the
10 HUD also and see the ground to the side of the HUD,
11 still in front of the aircraft, but to the side of
12 that HUD screen?

13 LT. COLONEL HORSTMAN: There's a couple of
14 inches left and right, yes, sir, there is.

15 MR. TURK: And that doesn't show up in
16 your video because you are focusing on the HUD?

17 LT. COLONEL HORSTMAN: That's correct, and
18 it's really not relevant because the front of the
19 aircraft right there, as you probably noticed, is
20 flat, or relatively flat.

21 MR. TURK: We have no other questions on
22 this.

23 MR. GAUKLER: I have one other quick
24 question, if I could.

25 VOIR DIRE EXAMINATION BY MR. GAUKLER

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1 MR. GAUKLER: Lieutenant Colonel Horstman,
2 we're talking about this being a powered flight, okay,
3 at 200 knots. Assuming that you lost your engine and
4 you wanted to maintain 200 knots, to maintain 200
5 knots you would have to actually bring your nose down
6 some, right?

7 LT. COLONEL HORSTMAN: Approximately 5,
8 5.5 degrees, yes, sir.

9 MR. GAUKLER: So your nose would be lower
10 than what you showed in the video?

11 LT. COLONEL HORSTMAN: Yes, sir.

12 MR. GAUKLER: Okay.

13 MR. TURK: I'm sorry, I had one other
14 question that I forgot to ask, if I may?

15 CHAIRMAN FARRAR: Wait a minute. Mr.
16 Gaukler and I have asked the same question three
17 times, and I sense we've gotten three different
18 answers. I'm not blaming you. It's just that -- was
19 your last question, Mr. Gaukler, because this was a
20 powered flight?

21 MR. GAUKLER: Well, yes, my question to
22 him, he was showing powered flight at 200 knots, okay,
23 and he was saying this was representative, if I
24 understood him, because he had 200 knots when you had
25 engine failure. My question was, without the engine,

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1 without having a powered engine, and you wanted to
2 maintain 200 knots, in fact, you would have to bring
3 your nose down in order to keep the speed at 200
4 knots. You're lower than --

5 LT. COLONEL HORSTMAN: Yes, your flight
6 path would be about 5.5 degrees below the horizon, I
7 believe.

8 MR. GAUKLER: Well --

9 CHAIRMAN FARRAR: I'm confused again
10 between flight path and attitude of the plane. We've
11 got two things, flight versus attitude and flight
12 versus gliding. So at 3,000 feet we're trying to
13 maintain, we're trying to fly at 200 knots, and we
14 either have power or we don't.

15 LT. COLONEL HORSTMAN: Okay.

16 CHAIRMAN FARRAR: What's the attitude of
17 the plane and what's the flight path?

18 LT. COLONEL HORSTMAN: The flight -- the
19 relative difference at 200 knots between that little
20 plus on the top of the video and your flight path,
21 that will remain constant.

22 CHAIRMAN FARRAR: Forget the simulator.

23 LT. COLONEL HORSTMAN: Okay.

24 CHAIRMAN FARRAR: Talking like I'm sitting
25 in there with you, I'm at 3,000 feet with an engine

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1 providing thrust, and I want to just cruise across the
2 countryside at 200 knots.

3 LT. COLONEL HORSTMAN: Okay.

4 CHAIRMAN FARRAR: Okay, the flight path
5 here is level.

6 LT. COLONEL HORSTMAN: Yes, sir.

7 CHAIRMAN FARRAR: And is the nose up or
8 down?

9 LT. COLONEL HORSTMAN: The fuselage
10 reference line, which is the nose of the aircraft, is
11 11 degrees above, 11 to 12 degrees above the horizon.

12 CHAIRMAN FARRAR: Okay. Now I'm at the
13 same 3,000 feet, 200 knots, lost power, and I want to
14 glide as far as I can maintaining 200 knots.
15 Obviously, the flight path is descending, but where's
16 the nose, the longitudinal axis?

17 LT. COLONEL HORSTMAN: The flight path
18 marker would be about 5.5 degrees below the horizon.

19 CHAIRMAN FARRAR: Okay, but that's the
20 simulator.

21 LT. COLONEL HORSTMAN: No, no, no, it's
22 real life.

23 CHAIRMAN FARRAR: No, I'm an observer
24 sitting on a cloud off on the side here.

25 (Laughter.)

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1 What I am seeing?

2 LT. COLONEL HORSTMAN: You're going to see
3 a descent rate of the standard F-16 descent rate which
4 has been discussed, seven over five.

5 CHAIRMAN FARRAR: But what am I going to
6 see about the longitudinal axis? Is the nose pointing
7 up or down?

8 LT. COLONEL HORSTMAN: Because of the air
9 speed, it's going to be 11 to 12 degrees above the
10 flight path. So it's irrespective of where the
11 aircraft, whether you're level or descending, it's
12 that air speed and angle of attack relationship
13 difference. So if you're descending at 5.5 degrees,
14 your aircraft nose is pointed, call it, 6 degrees
15 above the horizon.

16 CHAIRMAN FARRAR: Okay, got it. Okay,
17 thank you.

18 LT. COLONEL HORSTMAN: Yes.

19 CHAIRMAN FARRAR: If that's the end of the
20 voir -- you have more voir dire, Mr. Turk?

21 MR. TURK: Yes.

22 VOIR DIRE EXAMINATION BY MR. TURK

23 MR. TURK: On that same line about the
24 elevation above horizon and the angle of the nose, I
25 have to admit to being somewhat confused. Maybe a

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1 little knowledge is a bad thing.

2 I always thought that the F-16 can fly
3 level. It does, doesn't it? There's no reason for
4 the plane itself to point 11 degrees above horizon?
5 The fuselage can be level throughout this time,
6 correct?

7 LT. COLONEL HORSTMAN: At about 560, I
8 think, knots to 600 knots, the fuselage reference line
9 and the flat path marker will be coincidental. So,
10 yes, it is possible, a level flight, just under the
11 mach.

12 MR. TURK: And, otherwise, the F-16 flies
13 pointed upwards?

14 LT. COLONEL HORSTMAN: Every airplane
15 does. The Boeing 737 at level flight the nose is 4
16 degrees above the back of the airplane. They design
17 them that way.

18 MR. TURK: Now the nose of the F-16, if we
19 picture the aircraft, the F-16 does not have a nose
20 that's centered at the center of the fuselage. In
21 other words, if you were to draw a straight line
22 running through the center of the fuselage from the
23 back of the plane to the front of the plane, that line
24 would not end at the tip of the nose cone. In fact,
25 it would end higher than the tip of the nose cone

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1 because the nose cone is level at the bottom,
2 relatively, and it slants downwards on the top of the
3 nose cone as it reaches out from the aircraft going
4 towards the forward tip of the cone, correct?

5 LT. COLONEL HORSTMAN: I think so.

6 MR. TURK: Is that confusing?

7 LT. COLONEL HORSTMAN: It's irrelevant.
8 It's irrelevant because in the heads-up display what
9 you're looking at is the precise angle of where the
10 aircraft is pointed, that fuselage reference line.

11 That is the little plus in the top of the
12 video.

13 CHAIRMAN FARRAR: Mr. Turk, may I suggest
14 that we have enough Voir Dire now to hear the
15 arguments?

16 MR. TURK: Okay.

17 CHAIRMAN FARRAR: We could pursue this
18 forever. I will give you a couple more questions if
19 you need them.

20 BY MR. TURK:

21 Q What confuses me is why would the nose be
22 11 degrees above the flight path? The plane itself,
23 you are stating essentially the plane is not flying
24 level, but it is pointing upwards? The fuselage --

25 A I'm saying both things, precisely both

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1 things. The aircraft is flying level and it is
2 pointed above the horizon, that is how airplanes fly.

3 Q So it is flying with its nose pointing
4 higher than the fuselage flight path, or it is -- is
5 the fuselage pointing 11 degrees above the horizon?

6 A Yes.

7 Q The entire fuselage?

8 A Yes.

9 CHAIRMAN FARRAR: Why don't we get into
10 the arguments. I'm confused about one thing, but I
11 won't ask. Well, I thought I always understood how
12 wings work and provide lift, I've never understood how
13 that works when you are upside down, but we won't talk
14 about that.

15 THE WITNESS: It is actually very simple.

16 CHAIRMAN FARRAR: I'm sure the whole
17 audience would like to hear, since you all studied the
18 air flow thing in high school, or college, or
19 somewhere.

20 JUDGE LAM: At one time we all wanted to
21 be a fighter pilot.

22 THE WITNESS: To be humorous get in line,
23 sir. If you are upside down pulling one G, which is
24 what you would be level flight, it would be identical,
25 whether you are upside down or right side up.

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1 If you are upside down flying a level, you
2 will have minus 1-G.

3 CHAIRMAN FARRAR: What I don't get is
4 where the lift from the wings comes, because I always
5 learned that the airflow being faster over the top
6 gives you less pressure, and that is what gives you
7 your lift.

8 THE WITNESS: And that is, but that is
9 relative to the horizontal stabilizers as well. So
10 when you are -- say 200 knots, and you are 11 degrees
11 up at 1-G, if you were to invert that, you would be 22
12 degrees up, I'm guessing here, in order to maintain
13 level flight.

14 CHAIRMAN FARRAR: Okay.

15 THE WITNESS: And it is incredibly
16 uncomfortable.

17 CHAIRMAN FARRAR: We will ask that any
18 Commissioners, Court of Appeals Judges, or Supreme
19 Court Justices ignore the last couple of minutes, or
20 maybe they will find it interesting to.

21 Mr. Gaukler, given the Voir Dire is
22 completed do you want to go ahead with your
23 objections?

24 MR. GAUKLER: We do, Your Honor. Several
25 points, Your Honor. First of all I would like to

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1 respond to Counsel's argument that this is a new
2 theory. The theory is very simple, pilots avoid
3 sights on the ground, there is nothing new about that,
4 that is a well established theory, as you well heard
5 from six pilots now.

6 You also suggested that he was trying to
7 show reality through the simulator. Well, the
8 simulator shows what the simulator shows, it is not
9 reality. And trying to say it is Skull Valley it is
10 correct here in several respects.

11 At least in model any roads, you just have
12 the particular altitudes they were flying at. So it
13 is nothing in terms of other things a pilot would have
14 available to see what he could see.

15 Third, on the simulator line, we just
16 heard that he was the -- that the plane was on powered
17 flight, and if he didn't have an engine, he wouldn't
18 have a different flight path. Also we heard that
19 unlike the engine failure, he didn't zoom in this
20 instance, because an engine failure would zoom, and go
21 up high, then pull over. Which he would then have a
22 much better view.

23 And then also we just had the questions,
24 will you still have, those are some fundamental
25 problems that we have with the purpose of the

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1 simulation, I think, that Judge Lam is suggesting, we
2 don't disagree at some point a target will go below
3 the cone, go below the nose of the airplane.

4 You heard Col. Fly testify to that as
5 well, so we don't dispute that basic point. But we do
6 dispute this simulation which they are trying to show
7 as reality, which we do not think is reality, for the
8 reasons I've stated.

9 In addition we have the other, what I
10 would call, kind of modeling problems that we referred
11 to, in terms of understanding what this program can do
12 with modeling, the fact that he was holding a video
13 camera shooting it, the fact that as he, himself, said
14 yesterday, the fidelity on the screen is much less
15 than it would be.

16 So for those various reasons we would
17 object to the introduction of this exhibit.

18 CHAIRMAN FARRAR: Thank you, Mr. Gaukler.
19 What is the Staff's viewpoint?

20 MR. TURK: Your Honor, it is a simulation,
21 it shows what was simulated. It doesn't show what
22 would occur in the event of an engine failure, as the
23 plane is going through Skull Valley, or anywhere else,
24 for several reasons.

25 One is as Lt. Col. Horstman indicated,

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1 power was kept on, rather than allowed to shut off.
2 There was no zooming, as Mr. Crawford pointed out. He
3 held the pilot's head essentially fixed, without the
4 pilot being able to move his head either to the side,
5 or to go around the HUD screen, was basically focusing
6 only through the HUD screen.

7 We intend to introduce an exhibit, later,
8 that will show the HUD display, and what a pilot can
9 see to the sides of the HUD display, as he is in
10 flight.

11 The simulation did not involve any rolling
12 of the aircraft, or any attempt to look down, other
13 than through the HUD screen. There was no attempt to
14 point the aircraft somewhat off center in order that
15 the pilot can get a better view of what is ahead of
16 him, which a pilot could have done if, in fact, he
17 wanted to.

18 There was no lifting of the head in order
19 to obtain a better view. So it is a very limited
20 simulation, it shows only the one thing that Lt. Col.
21 Horstman tried to show, which is, what does it look
22 like if you are pointing the aircraft straight ahead,
23 with steady power, looking through the HUD screen.

24 We don't think it is representative of
25 what a flight condition would be like if a pilot had

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1 lost power and was on the verge of having to eject in
2 Skull Valley, or anywhere else.

3 CHAIRMAN FARRAR: Mr. Soper?

4 MR. SOPER: I admit this is new in that
5 the Applicant is attempting to quantify a previously
6 unknown characteristic, and use it as a law, or a
7 property, as you would in science, it is new in that
8 respect.

9 This may not be reality, it is a computer
10 program that is designed for the very purpose that we
11 are using it. The Air Force relies on it, it is the
12 best that there is.

13 It makes me recall the black box that the
14 Applicant and the Staff championed, named Dynamo,
15 which is a proprietary program used by Holtec, that
16 nobody knows anything about, and was kept a secret,
17 yet they champion the capabilities of that, and they
18 are not used by the United States government for
19 anything, it is simply an in-house, unknown.

20 If we asked for an example of a pilot
21 bailing out at 2,000 feet, 3.2 miles from a particular
22 site, after having first seen a structure on the
23 ground, taking some action to avoid it, and was
24 successful, that would be great. We don't have that.

25 There is not a single accident report in

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1 here that represents that, not one. We don't have any
2 anecdotal stories of that. They are asking us to
3 conclude that that scenario will happen based on
4 things that don't represent that.

5 In other words, argue by analogy. That is
6 their whole theory.

7 CHAIRMAN FARRAR: Is that in argument in
8 favor of the admission of this videotape, or is that
9 an argument about the weakness you see in their case?

10 MR. SOPER: Well, I'm saying, that is in
11 response to Mr. Gaukler and Mr. Turk saying this is
12 not reality. I'm saying we don't have reality, we
13 don't have a real life example of that ever happening.

14 This whole case is what evidence do we
15 have that that may happen? And I'm saying that this
16 is as close to reality as any other piece of evidence
17 that the Court has seen.

18 Now, if there is a problem in front of the
19 -- what the pilot can see, whether you call it the
20 nose, or the height of the dashboard in front of the
21 eyes, and they want to hide that fact from the Board,
22 what kind of sense does that make?

23 MR. GAUKLER: I object to that.

24 CHAIRMAN FARRAR: This is argument. I
25 knew you wouldn't like it, but --

1 MR. SOPER: Well, you know, I'm sorry. I
2 don't mean anything but --

3 CHAIRMAN FARRAR: It is not personal.

4 MR. SOPER: But obviously, I mean, that is
5 what we are talking about here. We are talking about
6 an experienced pilot telling us this is what happens
7 in an F-16, and certain things you can't see.

8 What, are we to ignore that, say it is not
9 reality, because it is not something that happened in
10 a real example of what we are trying to say would
11 happen? We don't have a real example. We have bits
12 and pieces of information that we are trying to piece
13 together to say whether or not that real example would
14 happen.

15 And I'm saying that this is an important
16 piece of it. Now, there has been cross examination,
17 and people have pointed out what they believe to be
18 limitations in how that evidence could be used, and
19 that is fine.

20 But why in the world would we want to
21 ignore it?

22 CHAIRMAN FARRAR: Mr. Gaukler, any
23 response?

24 MR. GAUKLER: Well, first of all two
25 things. I take issue with the word hide. Our expert,

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1 Col. Fly testified to the same thing that Lt. Col.
2 Horstman did. So I don't think that there is any
3 dispute to the basic scientific, mathematical,
4 geometrical principles that Judge Lam referred to.

5 Secondly, the point is that this also is
6 not a real example, because it didn't model a real
7 example for the reasons I've stated, and won't go
8 through again.

9 CHAIRMAN FARRAR: Staff?

10 MR. TURK: The only way you wouldn't
11 obscure the ground below the plane is if you are
12 flying in a bubble, in which you had total vision all
13 around you, and below you. We don't claim that there
14 is no obscuring of the ground at some point.

15 The only question is, what does this video
16 show us, and is it a good representation of what a
17 pilot would see if he was experiencing engine failure,
18 and on the verge of ejecting in Skull Valley, and our
19 view is that it is not representative.

20 CHAIRMAN FARRAR: All right. Give us a
21 minute.

22 (Pause.)

23 CHAIRMAN FARRAR: We got to the next to
24 the last day of the Hearing, without the Board ever
25 having been in disagreement on a matter of admission

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1 of evidence.

2 (Laughter.)

3 CHAIRMAN FARRAR: And several times have
4 said how valuable the advice is that I have gotten up
5 here, and given my colleagues number of years of
6 sitting on these cases.

7 We are going to admit both documents, but
8 the reasons are significantly different on both. On
9 the first one, the Bernard video, we are in total
10 agreement. This is an Air Force, the issue in this
11 case, or one of the issues involves training.

12 This is an official Air Force training
13 video. It, even though it is not one of the number of
14 reports that have been put in, in this case, since it
15 predated that period, it is an actual ejection by an
16 actual pilot, and his experience in what he did right,
17 and what he did wrong, were apparently presented by
18 the Air Force to train other people.

19 And for that reason we are going to let it
20 in, notwithstanding the fact that the beginning, that
21 we appreciate that the beginning of the video deals
22 with a non Skull Valley type of circumstance, that the
23 pilot was involved in continuing the maneuvers that
24 would be the equivalent, I guess, that once you get
25 out of Skull Valley, onto the Utah Test and Training

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1 Range.

2 Having said that,, it is still, by analogy,
3 offers you one example of the types of distractions
4 that different parties have said a pilot might face.
5 So while we understand it is not a Skull Valley
6 situation, we think the video is useful.

7 I regret that neither the Board, nor any
8 of the Parties took Col. Bernard up on his offer the
9 day he testified. He said he had a video, and we were
10 in unfamiliar surroundings at the State Capitol, and
11 we didn't have the facilities to look at it then. And
12 we said we would take it up later.

13 Whether we -- what the Parties want to do
14 about it, and unfortunately it is much later, but that
15 did not deprive the Company and Staff the opportunity
16 to review it last night.

17 And so that document is in, and that is
18 our unanimous view.

19 (The document referred to,
20 having been previously marked
21 for identification as State
22 Exhibit No. 220 was received in
23 evidence.)

24 CHAIRMAN FARRAR: On the Horstman video we
25 are far from unanimous, but -- and it has a lot of

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1 deficiencies that the Applicant and Staff have pointed
2 out, the whole matter of how it was modeled, how it
3 was created, how you capture on a video what you would
4 see at a simulator, the absence of the mountains, the
5 absence of the roads, all that is highly important.

6 But the Air Force does use these
7 simulators in the training. Again training is an issue
8 in this case, and so without indicating which Board
9 member or members feel which way about it, this is an
10 example where we will let it in for what it is worth.

11 We are concerned that it does not, it may
12 not depict reality. Judge Lam's points are well
13 taken, that this is in large measure just a geometric
14 optical exercise.

15 So at the end of the day we may or may not
16 be able to give this video any weight. To the extent
17 that the Applicant and the Staff, particularly the
18 Applicant feels that it is deficient, you have your
19 people here who can say, you know, this really doesn't
20 reflect reality, they will have that opportunity on
21 rebuttal.

22 But given that at least one Board member
23 thinks there may be some value to this, we are going
24 to let the video in, subject to all those limitations.

25 (The document referred to,

1 having been previously marked
2 for identification as State
3 Exhibit No. 221 was received in
4 evidence.)

5 CHAIRMAN FARRAR: That is where we are.
6 It is, again, we all thank all of you for your
7 excellently put arguments. It is now 10:25, it would
8 be time for a break, anyhow.

9 Mr. Soper, this may help you reorganize
10 your future questioning, and given the widely varying
11 estimates you gave us yesterday, how long do you think
12 you are going to need today?

13 And I take it that, I mean, most of your
14 time has been consumed not in your questions, but in
15 arguments about these very important matters. So what
16 are you looking at?

17 MR. SOPER: Well, I'm still thinking that
18 two hours would probably be the best I could do.

19 CHAIRMAN FARRAR: Okay. Then we are still
20 in no danger of not making our noon deadline tomorrow,
21 I take it? Although this may, the introduction of
22 this, Mr. Gaukler, if you need rebuttal --

23 MR. GAUKLER: We will have some rebuttal,
24 I don't think it --

25 CHAIRMAN FARRAR: We get it, it can be

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1 short.

2 MR. GAUKLER: It is not going to be that
3 long a rebuttal.

4 CHAIRMAN FARRAR: People can say what they
5 think about this, they've heard our questions that
6 we've asked during arguments. So as you think about
7 what that rebuttal would involve, give it to us short
8 and simple.

9 Ms. Marco?

10 MS. MARCO: And, Your Honor, I would like
11 to remind you that the Staff has under a half an hour
12 for our rebuttal.

13 CHAIRMAN FARRAR: Right, you won't have
14 any Air Force type people challenge, and the
15 introduction of the video --

16 MS. MARCO: That is correct.

17 CHAIRMAN FARRAR: -- doesn't change --

18 MS. MARCO: Does not change our estimate.

19 CHAIRMAN FARRAR: Yes, okay.

20 MR. TURK: We will be doing some cross
21 examination with respect to the video.

22 MS. MARCO: But not rebuttal.

23 CHAIRMAN FARRAR: Okay. And, again, on
24 that type of cross examination, we get it. There are
25 serious limitations in this, so we don't -- you know,

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1 we don't need to hear them all again.

2 It is almost half past, let's come back at
3 quarter to, and we will go from there.

4 (Whereupon, the above-entitled matter
5 went off the record at 10:28 a.m. and
6 went back on the record at 10:48 a.m.)

7 CHAIRMAN FARRAR: Before we resume, I
8 neglected to mention in the remarks explaining our
9 rulings, that one factor motivating allowing in the
10 Horstman video, was Mr. Soper's argument that there
11 have been other simulations.

12 In other words, we are striving for
13 reality here. We recognize that this is a simulation.
14 And perhaps, as we indicated, not a particularly good
15 one, but there have been other simulations entered
16 into the record, and you all will, may or may not have
17 come more or less close to reality, and those will be
18 the subject of argument when you file your post-
19 hearing filings.

20 And so we thought that this one should be
21 in, and subject to the same types of arguments about
22 any limitations it may bring with it.

23 JUDGE LAM: Furthermore I think this
24 Licensing Board is perfectly capable of cutting
25 through anything that is non-related to the issues

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1 before us. For example the combat training.

2 We are well aware that it has nothing to
3 do with the Skull Valley type of flying event, so we
4 would certainly disregard that part of the tape
5 relating to combat training and stress levels, in that
6 regard.

7 CHAIRMAN FARRAR: Then, Mr. Soper, let's
8 go ahead with your long interrupted examination of
9 your witness.

10 MR. SOPER: Thank you, Your Honor.

11 BY MR. SOPER:

12 Q Lt. Col. Horstman, tell us please, what
13 part of the aircraft it is that would obstruct the
14 view of ground closest to the pilot?

15 In other words, is it the nose of the
16 aircraft that we think of, is it the dashboard, or
17 what is it, really?

18 A The F-16 it would be a combination of the
19 wind screen and the up front control, which is
20 attached to the heads up display.

21 Q Is that -- can we think of that as being
22 the dashboard of the aircraft?

23 A You could, and there are some diagrams
24 that depict that, what it looks like.

25 Q And the top of the dashboard, so to speak,

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1 comes up about how high relative to your face?

2 A Your chin.

3 Q It is about chin high, level with your
4 chin you would say?

5 A Yes.

6 Q And it is roughly how far from your face?

7 A I'm guessing 20 inches.

8 Q So it is not the actual, the nose, or the
9 tip of the aircraft, but this dashboard is the part of
10 the aircraft that obscures the vision in front of the
11 plane?

12 A Yes, sir.

13 Q Then, if you would sir, explain to us, in
14 the event that a pilot would lose an engine, have an
15 engine failure in Skull Valley, and he was flying
16 three to four thousand feet above ground level, he
17 would in that event zoom the aircraft, is that right?

18 A That is what he is supposed to do, I would
19 assume he would do that.

20 Q And that, at that point in time, the zoom,
21 which is an increase in elevation, takes place without
22 any power, right?

23 A Yes, sir.

24 Q And at some point he would pushover, in
25 other words, start to come down from the zoom?

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1 A Yes, we call that bunting.

2 Q And that would be the apex, so to speak,
3 of the zoom?

4 A Yes, sir.

5 Q And what speed would that occur at?

6 A You would begin that maneuver at
7 approximately 250 knots per the Dash One. It would
8 depend on your configuration, if you kept your stores,
9 how much fuel you had on board, about 250.

10 Q At 250 you would start to, the bunting, or
11 turning the plane over?

12 A Pushing the airplane over.

13 Q Pushing it over.

14 A If you turn the airplane over you roll it
15 on its back.

16 Q Sorry, okay. And does that maneuver, the
17 bunting so to speak, does that also take some air
18 speed, consume some air speed?

19 A It does, because you are still climbing,
20 and there is no engine. It takes, I don't know the
21 exact time, a few seconds. And it does take some
22 energy. You should finish that maneuver at about 200
23 knots, which is a goal.

24 Q So after the plane starts its decent,
25 following the zoom, you would roughly at that point be

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1 traveling 200 knots?

2 A That is the goal, yes, sir.

3 Q That is the goal. And then you would
4 glide at 200 knots, is that right?

5 A Yes, sir.

6 Q And that glide path would, typically and
7 preferably, be about 5 percent, excuse me, 5 degrees?

8 A Yes. And if you have a little more fuel
9 on board it would be slightly steeper, but it is about
10 5 to 6 degrees, is the glide path of the aircraft.

11 Q And while you are gliding the
12 configuration, or the position of the aircraft,
13 relative to the horizon, would be pointing slightly up
14 about 6 degrees?

15 A Yes, the actual aircraft, looking at it
16 from the side, or the fuselage reference line, the
17 aircraft would be pointed 6 degrees nose up, and
18 descending 6 degrees nose down. Not nose down, but
19 you are descending at 6 degrees, and the nose is still
20 5 degrees, 6 degrees above the horizon.

21 Q Now, every time the nose is pointing up,
22 or above the horizon like you say, then the ground,
23 the amount of ground in front of the aircraft becomes
24 more obscured, the more the nose points up, is that
25 correct?

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1 A Yes, up to 90 degrees nose high, then it
2 becomes larger, because you are going upside down
3 then.

4 Q And does the plane continue to travel
5 during its glide, at this attitude of about 6 degrees
6 nose up, throughout its glide?

7 A Yes, sir.

8 Q And what about does the plane, at some
9 point, slow down even further?

10 A You could actually impact the ground at
11 that airspeed, and your ground speed would be relative
12 to whatever the current wind is. If you had a tail
13 wind it would scoot you along the ground faster.

14 But somewhere before the ejection
15 altitude, you have to begin the ejection sequence,
16 which as Col. Fly described, is you slow it to its
17 slowest possible, to reduce injury.

18 Q Where would that typically be in a -- if
19 you were going to eject at 2000 feet, where would you
20 typically start trying to slow your aircraft?

21 A Probably about 2,500 feet above the
22 ground.

23 Q And how would you go about slowing the
24 aircraft at that point?

25 A I would just pull back on the stick to get

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1 the nose, essentially, as high as it would go. It
2 wouldn't go as high as you would expect, normally,
3 because the computer is going to limit your angle of
4 attack. And it is going to stop you, I don't know, 16
5 or 18 degrees angle of attack.

6 Which would, you would get the nose
7 jacking up as high as you can, essentially trying to
8 hold the altitude constant, while slowing down, and
9 you would eject. So the nose would be extremely high,
10 very high, or whatever.

11 Q It would be higher than the 6 percent,
12 excuse me, 6 degree nose up that the previous part of
13 your glide had been at?

14 A Yes, sir. It would probably be 20
15 degrees. I'm guessing there, I haven't done it in the
16 last four years, three years.

17 Q Okay. So at the point of 2,500 feet,
18 until the pilot ejected, the nose up would be more
19 than 6 degrees, maybe as much as 20 degrees?

20 A That is correct.

21 Q So at the point, at the time of ejection,
22 even additional obscuring of the vision ahead of the
23 plane would occur?

24 A Yes, sir. I don't think you could see 10
25 miles in front of the airplane before you did it.

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1 MR. SILBERG: I just have a clarification,
2 I may have missed it. The difference between the 16
3 to 18 degrees, which you said the computer, that is as
4 much --

5 THE WITNESS: Angle of attack.

6 MR. SILBERG: And the 20 degrees?

7 THE WITNESS: Is the nose attitude.

8 BY MR. SOPER:

9 Q What is the difference between angle of
10 attack and nose attitude?

11 A The briefest explanation is, when we were
12 flying in the video at 400 knots, the flight path was
13 level, and the aircraft was pointed about a degree
14 above the flight path.

15 When we were at 200 knots they are 11
16 degrees apart. That is, essentially, the explanation.
17 The slower the airplane is going through, while it is
18 flying, the slower air speed, the more nose up you are
19 going to be.

20 There are some slow speed demos that the
21 fighters do, the Thunderbirds etcetera, I don't know
22 the exact speed. I'm guessing probably 60 or 70
23 knots, and the nose appears to be 30 to 40 degrees
24 above the ground.

25 Q So when the pilot slows down prior to

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1 ejection, tries to get the nose as high as possible,
2 would that be, at least, 10 or 11 degrees?

3 A Yes, sir. The nose would go up to about
4 20 degrees, my guess.

5 MR. GAUKLER: Since we are talking several
6 different things, angle of attack, and above the
7 horizon, could you specify what the 20 degrees is,
8 what angle you are talking about?

9 THE WITNESS: The nose of the aircraft
10 would be pointed 20 degrees above the horizon. Sorry.

11 BY MR. SOPER:

12 Q At the risk of repeating, is that
13 different than the angle of attack?

14 A Yes. What you would find is --

15 Q Let me ask you this, excuse me for
16 interrupting, but to clarify the question for you,
17 what is important for us to know? We are interested
18 in knowing what figure would allow us to know how much
19 the dashboard of the cockpit is going to obscure the
20 ground in front.

21 Would that be the degrees of nose up that
22 we are interested in, to know that?

23 A Yes, it would. If you were to do this
24 maneuver that we've described, properly, perfectly,
25 and you ended up at 2000 feet above the ground, in

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1 level flight, your flight path marker would be on the
2 horizon. And the fuselage reference line would be
3 well above 20 degrees.

4 You would not be able to see the ground.
5 If you were in level flight, over the ocean, you would
6 not be able to see the ocean and the sky, where they
7 meet, completely obscured.

8 Q Now, that would be 20 degrees nose up?

9 A Yes.

10 Q And on your simulation you showed a run
11 where the nose was 11 degrees nose up, is that
12 correct?

13 A That is correct.

14 Q And at approximately four miles from the,
15 excuse me, the ground in front of the aircraft was
16 obscured for approximately four miles from 2000 feet,
17 with the nose pointed 11 degrees up, is that right?

18 A That is correct.

19 CHAIRMAN FARRAR: Mr. Soper, let me just
20 ask one question that I think is obvious, and I
21 understand that we are interested in where the nose
22 is, because of the vision problem.

23 But when you keep talking about nose up
24 you don't, in terms of flying the plane, you don't
25 care where the nose is, the whole purpose of nose up

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1 is to change the angle of attack of the wings, right?

2 I mean, it is not the nose that is flying
3 the plane, you put the plane in that attitude because
4 you want to change air flow over the wings?

5 THE WITNESS: Yes, sir. You set that
6 pitch attitude to a G desirable flight path.

7 MR. SOPER: I have an exhibit that I would
8 like to have marked.

9 CHAIRMAN FARRAR: Let's go off the record
10 to see how we are going to handle this.

11 (Whereupon, the above-entitled matter
12 went off the record at 11:02 a.m. and
13 went back on the record at 11:05 a.m.)

14 CHAIRMAN FARRAR: Let's go back on the
15 record. While we were off Counsel for the State
16 distributed a very large folded map to the Board, and
17 everyone else, and also has two, we are informed,
18 identical maps mounted on foam board, one of which the
19 Board has near its area, and one of which will be used
20 to examine the witnesses.

21 Mr. Soper, you would like this proposed
22 exhibit marked as what?

23 MR. SOPER: As State 222.

24 CHAIRMAN FARRAR: That will be marked as
25 State 222.

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1 (Whereupon, the above-
2 referenced to document was
3 marked as State Exhibit No. 222
4 for identification.)

5 MR. TURK: These are aerial photographs,
6 is that correct?

7 CHAIRMAN FARRAR: We don't know yet what
8 they are, we will find out. Off the record.

9 (Whereupon, the above-entitled matter
10 went off the record at 11:06 a.m. and
11 went back on the record at 11:06 a.m.)

12 CHAIRMAN FARRAR: Back on the record. Mr.
13 Soper, if you would continue describing what this is.

14 MR. SOPER: I'm going to have the witness
15 do that. Thank you, Your Honor.

16 BY MR. SOPER:

17 Q Lt. Col. Horstman, you have before you
18 what has been marked as State exhibit 222. Can you
19 briefly describe what that is, please?

20 A This is an aerial photography, aerial view
21 of Skull Valley around the confines of the proposed
22 PFSF.

23 Q And have you, yourself, flown through
24 Skull Valley, or over Skull Valley, and had an
25 occasion to take a look at it from the air, recently?

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1 A Yes, sir, many times.

2 Q And do you recognize this as, in fact,
3 being Skull Valley?

4 A Yes, sir, I do.

5 Q Can you tell us what the bolder black
6 outline on this map is, what it portrays? I will
7 represent that the legend shows that that outline
8 would be the Goshute Reservation.

9 A Yes, sir. The large black marking is the
10 perimeter of the Goshute Reservation. And then in the
11 upper left-hand corner of the Goshute Reservation, is
12 a diagram of the ground on which the PSFS site would
13 be built.

14 Q And the scale on this map, at the bottom,
15 appears to be -- well, there is a scale there on the
16 bottom, given in feet, and given in miles. Is that
17 correct, sir?

18 A Yes, sir.

19 Q And according to that scale the width of
20 this map would represent --

21 A It looks, without measuring it, about 8 or
22 9 miles for the width. That is a guess.

23 Q And over on the right-hand side there are
24 some smaller aerial photos?

25 A Yes, sir. Those are blowups of four

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1 different pieces of ground inside the overlay of the
2 photograph. The top one is inset A, it is the Gochute
3 Village, which is located almost in the center of the
4 aerial photograph.

5 Insert B, or inset B, is a residence, it
6 is a ranch. It is located about a third of the way
7 down on the Skull Valley road. Inset C is a ranch
8 residence. That is located almost at the very top
9 middle of the map.

10 And inset D is the Tekoi Rocket Test
11 Facility, which is located in the bottom lower left-
12 hand corner of the overview.

13 Q Now, this aerial photo is not supposed to
14 depict a particular altitude, it is only to show the
15 relative locations of features in Skull Valley, is
16 that right?

17 A That is correct.

18 CHAIRMAN FARRAR: Mr. Soper, before you
19 continue, let me ask a couple of clarifying questions.
20 Col. Horstman, on the left side of the bit picture in
21 the map, that portion from top to bottom looks
22 significantly darker than the others. Is that just a
23 byproduct of different cameras at different times?

24 THE WITNESS: Yes, sir. This was taken
25 three years prior to this.

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1 CHAIRMAN FARRAR: Okay.

2 THE WITNESS: That is the only thing that
3 is --

4 CHAIRMAN FARRAR: When you say this, you
5 mean the left-hand darker, the vertical strip?

6 THE WITNESS: Yes.

7 CHAIRMAN FARRAR: All right. And the
8 second Skull Valley road is running vertically on the
9 map, just to the right of that darker strip we just
10 talked about?

11 THE WITNESS: Yes, sir, and it runs
12 vertically from top to bottom, a couple of very slight
13 bends. One of the things you notice is that it is
14 very difficult to see, in this photograph.

15 CHAIRMAN FARRAR: I hadn't noticed that
16 yet, I was just asking -- we will talk about that
17 later, I'm sure. I was just trying to make sure that
18 I was oriented on the map.

19 MR. SILBERG: Could I ask a couple of
20 questions?

21 CHAIRMAN FARRAR: Of that same nature?

22 MR. SILBERG: Yes.

23 CHAIRMAN FARRAR: Yes.

24 MR. SILBERG: Lt. Col. Horstman, who put
25 the dark lines on this map?

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1 THE WITNESS: Our staff did, we asked them
2 to --

3 MR. SILBERG: I'm sorry, your staff?
4 Southwest Airlines?

5 THE WITNESS: I'm not representing
6 Southwest Airlines, sir.

7 MR. SILBERG: You mean the staff of the
8 State?

9 THE WITNESS: Yes, sir.

10 MR. SILBERG: Who was it?

11 THE WITNESS: His name is Harold Sandbeck.

12 MR. SILBERG: And when was this prepared?

13 THE WITNESS: June 19th.

14 CHAIRMAN FARRAR: Of this year?

15 THE WITNESS: Of this year.

16 MR. SILBERG: I guess I would note that in
17 light of some of the other discussions, I guess I'm
18 surprised that the State didn't give us a copy of this
19 even last night.

20 MR. TURK: May I ask a few questions in
21 the nature of Voir Dire?

22 CHAIRMAN FARRAR: Yes.

23 MR. TURK: In the dark area that Judge
24 Farrar asked you about I see a lot of white areas,
25 which would appear to me to be mountains? But I know

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1 that is not what is actually there.

2 So could you explain what those white
3 areas are?

4 THE WITNESS: Rocks, sand, non-vegetation.

5 MR. TURK: And it is correct those are not
6 mountains in that area?

7 THE WITNESS: That is correct.

8 MR. TURK: And also it looks like Skull
9 Valley road has been written over with black lining,
10 is that correct?

11 MR. SILBERG: If you look above the top of
12 the photo there is a dark line coming right out of
13 Skull Valley road. Would that indicate that Skull
14 Valley road has been copied over, or written over?

15 THE WITNESS: Written over with a dark
16 line, no. Some of it is obscured, some of it is not.

17 MR. SOPER: Referring to the line, about
18 a two inch line at the top, right?

19 MR. TURK: We are referring to that line
20 that continues all the way down Skull Valley road,
21 from top to bottom, if that is Skull Valley road that
22 is lined over.

23 CHAIRMAN FARRAR: If I can follow up Mr.
24 Turk's question, looking at the legend in the lower
25 right portion of the document, the very dark is the

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1 boundary of the reservation. The lighter dark is the
2 boundary of the site, and -- but where is the -- well,
3 wait a minute.

4 And then, also, in dark is primary roads,
5 which I take it would be the explanation of why Skull
6 Valley road has a dark line over it?

7 THE WITNESS: That is correct.

8 CHAIRMAN FARRAR: But show me, is the site
9 that little vertical rectangle just to the left of
10 Skull Valley road, and between Skull Valley road and
11 the white areas that Mr. Turk referred to?

12 THE WITNESS: No, it is on the far left-
13 hand side of the overlay map.

14 CHAIRMAN FARRAR: All the way over there.
15 Okay, good, because I thought we drove farther than
16 that through the dust to get there. So it is way over
17 there, way over on the left edge of the map, almost.

18 THE WITNESS: It is a photograph, it is
19 not a map, sir.

20 CHAIRMAN FARRAR: I'm sorry.

21 THE WITNESS: That is okay, I mean, it is
22 technical.

23 MR. TURK: May I ask, also, what elevation
24 was the plane at?

25 THE WITNESS: I don't know, and neither

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1 did the Staff. It is a routine mapping operation.

2 MR. SILBERG: Lt. Col. Horstman, isn't it
3 true that the boundary that is drawn in for the
4 reservation is not correct, because it doesn't appear
5 to follow the actual boundaries that are shown on the
6 map?

7 THE WITNESS: Yes, sir. And Col. Fly
8 explained some of that, briefly, with respect to the
9 map. And this is a photograph.

10 MR. SILBERG: No, I'm talking about how
11 you --

12 THE WITNESS: I'm answering --

13 MR. SILBERG: -- how someone on your staff
14 drew the reservation on this map, and it doesn't
15 appear to coincide with the actual reservation
16 boundaries, it is offset, apparently, in almost every
17 location.

18 THE WITNESS: That is correct.

19 MR. SOPER: What reservation boundaries
20 are you referring to?

21 MR. SILBERG: Well, if you look at the
22 lines on the map, in the photograph, as opposed to the
23 lines that are drawn in, there are clearly lines that
24 represent the reservation boundary.

25 And the lines that someone has drawn don't

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1 track those boundaries.

2 THE WITNESS: If you look in the upper
3 left-hand corner of the line we have depicting the
4 reservation, you will see that they do not coincide
5 with the roads. When you are doing moving maps, and
6 graphical overlays, and grids, all of the data are
7 from different references.

8 So when you look at this map, it is stated
9 as a pictorial representation of the area.

10 CHAIRMAN FARRAR: Now that, for the
11 record, that is a map that was introduced early on in
12 the case by the Company?

13 THE WITNESS: Yes, sir.

14 MR. GAUKLER: Yes, it is either KKK, or
15 LLL.

16 MR. SILBERG: Those are blowups of
17 official Air Force maps.

18 THE WITNESS: What you will notice with
19 this is that, as Col. Fly was explaining, the railroad
20 up north, and the interstate are half a mile apart,
21 when in fact they are about 20 feet apart, that is how
22 you make maps.

23 When you do an image of the ground, and
24 try to translate geographical, as opposed to metes and
25 bounds, you will rarely have an identical overlay.

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1 This is merely a depiction of the essential boundaries
2 of the reservation.

3 CHAIRMAN FARRAR: All right. So as I
4 understand what you are saying, the dark line
5 overlaying the photograph is a rough approximation of
6 where your people thought the reservation boundaries
7 were?

8 THE WITNESS: That is correct.

9 CHAIRMAN FARRAR: And I take it we can --
10 if that becomes crucial we can discuss it further.
11 But since we don't know yet that it will be crucial,
12 let's not spend much more time on it.

13 MR. TURK: Another question about the
14 photograph. People are asking what time of year these
15 photographs were taken?

16 THE WITNESS: It is not the winter, it is
17 the summertime.

18 MR. TURK: And that is for both the dark
19 area on the left, as well as the rest of the
20 photograph?

21 THE WITNESS: I believe so, yes.

22 MR. SILBERG: Maybe we could speed this up
23 if Mr. Soper could tell us the purpose that he is
24 going to use this map for, and we will know whether it
25 is important as to whether this is accurate or not

1 accurate, or how it relates to, how the lines relate
2 to the photographs, or anything else.

3 CHAIRMAN FARRAR: That sounds like a good
4 idea. Mr. Soper?

5 MR. SOPER: I would like to continue my
6 examination. Actually we just sort of -- or would you
7 like me to just do a little narrative of what I expect
8 to show here?

9 CHAIRMAN FARRAR: Yes, right, since unlike
10 cross examination you are not trying to surprise
11 anybody, it would help all of us understand where you
12 are going, and what we need to be focusing on.

13 MR. TURK: Just one more voir dire? Was
14 the photograph magnified to some extent? How do you
15 take a photograph, how do you take the film from the
16 airplane and then blow it up, so do we know to what
17 level of magnification these photographs were
18 subjected?

19 THE WITNESS: Only the scale and the
20 quality. The insets in the right have been blown up
21 even more.

22 MR. SOPER: This is a typical aerial
23 photomapping with the scales and the equipment that
24 does this, it is all built into a commonly used
25 computer program that I think is standard in the

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1 industry.

2 CHAIRMAN FARRAR: Mr. Soper, what do you
3 want to do with this?

4 MR. SOPER: Well, number one, it seems to
5 me that there has been sort of a remarkable omission
6 to this point, in that we don't have a picture of the
7 site.

8 CHAIRMAN FARRAR: Okay.

9 MR. SOPER: It is kind of like --

10 CHAIRMAN FARRAR: Just tell us, you can
11 argue that later. Just tell us.

12 MR. SOPER: Forgive me, Your Honor, I will
13 try and not embellish as I go forward. And from that
14 picture we can see the relative areas there that are
15 inhabited, or otherwise occupied by business or
16 industry.

17 And we can see the various roads, and we
18 can see that the roads have different contrasts,
19 particularly if we look over in the inset where Skull
20 Valley road has not been marked as a road for
21 identification purposes.

22 And we can see Skull Valley road, and we
23 can see the contrast of that road, and the other roads
24 that run through the area. We can see the relative
25 distance away that the rocket test facility, the

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1 village, ranch sites, and so forth.

2 It is important because at this particular
3 scale we know that a pilot ejecting will eject 3.22
4 miles, at least. So 3 to 4 miles from the PFS site.
5 This gives us an idea of the ground features in that
6 area.

7 Now, this is -- should not be a surprise
8 to anyone. PFS has described these ground sites in
9 its ER, and the SER, and has a location of the rocket
10 facility described, and the location of the Goshute
11 Village, there is also a residence down by the rocket
12 facility, there are ranches just to the north.

13 These are all described in their
14 documents. So to suggest this is some sort of a
15 surprise, or anybody ought not to know what this looks
16 like, doesn't make much sense to me. The fact that we
17 are here talking about what is down there without a
18 picture of it seems to be an aid that we shouldn't be
19 without. That's my general idea of why we need this.

20 CHAIRMAN FARRAR: All right. Then in
21 terms of proceeding, should we just proceed or does
22 anyone want to interpose some objection to proceeding?

23 MR. TURK: If the State wishes to move
24 this in evidence we don't have an objection.

25 CHAIRMAN FARRAR: Right. But they're not

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1 -- Mr. Soper, are you ready to do that now, or are you
2 going to ask a few questions first? Or sometimes
3 people ask an entire series of questions and then
4 don't move it in until five hours later, so given --
5 so if nothing happened right now, Mr. Soper, what
6 would your next move be?

7 MR. SOPER: I would probably ask a few
8 more questions of Lieutenant Colonel Horstman about
9 the map, and then I would move its admission.

10 CHAIRMAN FARRAR: All right. Does either
11 the Applicant or the Staff have any objection to
12 proceeding in that fashion?

13 MR. GAUKLER: Let's listen to the
14 questions and we'll probably have some voir dire.

15 CHAIRMAN FARRAR: Okay.

16 MR. GAUKLER: And I would note -- I think
17 that I would echo what Mr. Silberg said. I think that
18 to have spent this long, we at least should have
19 received this map last night in accordance with the
20 way we've been trying to operate the past couple of
21 weeks in order to speed up this proceeding. And I do
22 want to note that for the record.

23 CHAIRMAN FARRAR: That's why I'm asking
24 these sort of unusual series of questions, given what
25 Mr. Silberg had said before.

1 Mr. Soper, do you have any more things in
2 your bag over there?

3 MR. SOPER: Well, only that it's -- I find
4 it quite remarkable that this is all a result of our
5 second bite produced from the introduction of Exhibit
6 100 without any notice whatsoever.

7 CHAIRMAN FARRAR: That's not what Mr.
8 Silberg is talking about, and that's not --

9 MR. SOPER: Oh, I thought that that was
10 appropriate. Sorry.

11 CHAIRMAN FARRAR: No. We have commented
12 several times on the remarkably good working
13 relationship everybody has had in this case. And I
14 think what they're arguing about is, or what they're
15 noting is not that this terrain is a surprise to them,
16 because it certainly isn't. But the thought that the
17 lawyers have had a formal, information, spoken,
18 unspoken code that you give each other, let's not call
19 it notice. Let's call it courtesy of saying what's
20 coming next, and I think that's the concern, so
21 without belaboring that, let me ask you in the
22 remainder of your case, is there anything else you
23 plan to come up with? And if so, why shouldn't you
24 deliver copies to everybody right now?

25 MR. SOPER: We have one other exhibit, and

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1 it is just a mirror to their Exhibit 100, a list of
2 those 59 flights and our observations regarding them.
3 But I'll repeat, now my understanding that from that
4 exhibit on, there hasn't been any code. I mean, I
5 have had -- this was produced to us without any notice
6 on the spur of the moment, an analysis of 59
7 accidents.

8 CHAIRMAN FARRAR: And we gave you a month
9 to look at it.

10 MR. SOPER: Well --

11 CHAIRMAN FARRAR: And if I say to Mr.
12 Silberg, Mr. Silberg, we'll give you a month to look
13 at this, he'll say that would be nice, but I don't
14 think my client wants to invest another month in this
15 proceeding, so it's not notice and their capability of
16 responding. It's --

17 MR. SILBERG: Common courtesy.

18 MR. SOPER: Well, it turns out to be
19 circumstance. We recessed and I had a month to look
20 at it. I mean --

21 CHAIRMAN FARRAR: Well, yes, it was nice
22 that we were able to take advantage of that month and
23 give you that, but if you've watched how we operate,
24 you might have gotten that month anyhow, even if that
25 was the last -- or you might not have gotten a month,

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1 but you would have gotten -- we would have asked you
2 how much time do you need, and you would have gotten
3 all that time. And if Mr. Silberg complained that
4 that slowed down his client's anticipation of when, if
5 he gets approval, this project would be completed, we
6 would have said tough luck.

7 MR. SOPER: But I might add, Your Honor,
8 that panel was still testifying on its rebuttal. And
9 I don't think I have to give them my exhibits, my
10 testimony to come while I'm still cross examining
11 them. That would be totally unfair.

12 CHAIRMAN FARRAR: Oh, you mean the panel
13 yesterday.

14 MR. SOPER: Yes, I mean their -- why would
15 I want to turn over my evidence? It's just like
16 filing pre-filed testimony. These questions that are
17 going to be asked on rebuttal, I don't know what they
18 are. Just because they come in the form of an exhibit
19 doesn't mean that there's any more courtesy than
20 asking a question that I don't know what's going to
21 come. So, you know, I'm still in the phase of cross
22 examination, and I shouldn't have to turn over what my
23 evidence is going to be. They certainly didn't.

24 MR. GAUKLER: We turned over --
25 particularly since --

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1 MR. SOPER: Exhibit 100 came with no
2 notice whatsoever.

3 MR. GAUKLER: I said particularly since
4 mid-May, since Exhibit 100, we have gone out of our
5 way to make sure that if we have any significant
6 exhibits, to give them to the State beforehand, just
7 because as the Board said, we recognize the Board's
8 going to give the other party reasonable time to look
9 at something that's significantly new. Something
10 that's significant and that is new, and that's how
11 come we've gone out of our way, particularly since --
12 well, we've gone out of our way since mid-May to do
13 that, for that particular reason. And we've done it
14 three, four times, two to four times, something in
15 that range.

16 MR. TURK: I would note only that this is
17 not an exhibit being used in cross examination,
18 neither were the video tapes. This is being used with
19 the State's own witness in their rebuttal testimony.
20 That's different from an exhibit that you want to use
21 to catch the other side's witness.

22 CHAIRMAN FARRAR: What I understand Mr.
23 Soper's point is, if you had had this in advance, or
24 if the Applicant had had it in advance, then they
25 could have built in in yesterday's examination of

1 their own panel a rebuttal to this in advance of it
2 ever being presented, and that's not how Mr. Soper
3 wanted to conduct his case.

4 MR. SOPER: The map, or example, I asked
5 Colonel Fly, well, where's the Rocket Test Facility,
6 and it's a significant feature. Where is that? Well,
7 he didn't know. Now I couldn't ask those questions if
8 I hand this out first. Same way of my Exhibit 100,
9 and everything that I've done here.

10 MR. SILBERG: He also gave the wrong name
11 for the Rocket Test Facility, but the basic point is
12 that we're operating with common courtesy. I had
13 asked you last night if you had any more tapes and you
14 said, "Well, I might. Probably don't."

15 MR. SOPER: No, I -- no, no, no, no, no.
16 I said I had no more tapes at this time.

17 CHAIRMAN FARRAR: Well, and --

18 MR. SILBERG: But we went out of our way
19 last Thursday night to send you the exhibits that we
20 were going to use, and common courtesy would have
21 dictated, whether or not this is important.

22 CHAIRMAN FARRAR: Okay. Let's do this.

23 MR. GAUKLER: And there's also a question
24 of supplementary discovery too in terms of relevant
25 documents, so that's wholly apart from cross

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1 examination.

2 CHAIRMAN FARRAR: Let's do this. I would
3 doubt that any dramatic rulings would come out of any
4 continued discussion of this matter. It's good to air
5 it so the people can say what's on their mind, but Mr.
6 Soper, now that you have mentioned that there's one
7 more exhibit, is there any harm to the presentation of
8 your case by making that exhibit available to people?
9 Because if we don't get to it tomorrow morning, and if
10 it's your mirror image or whatever you called it of
11 their 59 reports, they're going to say we need, if not
12 a month, they're going to need four hours, or five
13 hours, and we're all going to -- and the Board will
14 not achieve its independence on the 4th of July that
15 we were planning to achieve.

16 MR. SOPER: I will pass that out now. Is
17 that the Board's suggestion?

18 CHAIRMAN FARRAR: Why don't we do that?
19 Mr. Soper has just distributed to the Board and the
20 parties what we understand to be the last new exhibit
21 that he would be proposing. It's entitled, "Analysis
22 of Mishap Reports Shown on Applicant's Exhibit 100".
23 And, Mr. Soper, what number will we be giving this?

24 MR. SOPER: 223, Your Honor.

25 CHAIRMAN FARRAR: Okay. We'll mark this

1 now as State Exhibit 223 for identification.

2 (State Exhibit 223 marked for identification.)

3 CHAIRMAN FARRAR: And, Mr. Gaukler, have
4 you already handed this over to your advisors?

5 MR. GAUKLER: We're making copies right
6 now, Your Honor.

7 CHAIRMAN FARRAR: Okay. So they will be
8 able to use this afternoon to take a look at this.

9 MR. GAUKLER: Yes, Your Honor.

10 CHAIRMAN FARRAR: We appreciate the
11 parties' positions and approach on this. Let's go
12 ahead, Mr. Soper.

13 JUDGE LAM: Mr. Soper, Judge Farrar asked
14 you if handing out this State Exhibit 223 would harm
15 your case. I have not heard an answer from you.

16 MR. SOPER: Is that the -- 223 is the map?

17 JUDGE LAM: Right. Oh, he said no. What
18 was your answer to Judge Farrar's question? Did you
19 answer no?

20 MR. SOPER: I'm not sure. Was the
21 question asked to the map, or the --

22 CHAIRMAN FARRAR: No, no, no. The
23 question I asked was before I asked you to distribute
24 this exhibit in advance, since you had represented you
25 couldn't distribute the map in advance without

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1 compromising your cross examination, I thought I asked
2 you would handing out what's now marked as 223, would
3 that compromise your cross? And I thought you said,
4 "No, before I asked you --

5 MR. SOPER: No. It would have yesterday.

6 JUDGE LAM: Oh, okay.

7 CHAIRMAN FARRAR: Right.

8 MR. SOPER: While the panel was
9 testifying, I didn't want them to have the benefit of
10 what we claim. Thank you for asking that.

11 CHAIRMAN FARRAR: All right. Let's -- as
12 they say moving right along, which we have not been
13 doing, let's get going.

14 DIRECT EXAMINATION

15 MR. SOPER: Colonel Horstman, if I might
16 ask you, sir, if you would refer to on the map 222,
17 Exhibit 222, if you'd refer to Inset C.

18 LT. COLONEL HORSTMAN: Okay.

19 MR. SOPER: And I see there's a -- in
20 about the center of that inset, there's a map running,
21 or a road running from north to south.

22 LT. COLONEL HORSTMAN: That's correct.

23 MR. SOPER: And would that be the Skull
24 Valley Road?

25 LT. COLONEL HORSTMAN: Yes, sir.

1 MR. SOPER: And on the insets, there's no
2 markings over it to indicate a road or anything like
3 that. That's just aerial photo?

4 LT. COLONEL HORSTMAN: That's correct.

5 MR. SOPER: And I see some other roads
6 that appear to be running from Skull Valley Road, one
7 particularly predominant appears to be going easterly
8 from Skull Valley Road?

9 LT. COLONEL HORSTMAN: Yes, sir. It looks
10 like there's three roads running east, one's
11 predominant.

12 MR. SOPER: Okay. And what --

13 MR. TURK: In which photograph, the main
14 one or --

15 MR. SOPER: Insert C. And my question is
16 this, the Skull Valley Road appears to be darker than
17 the other roads that you see in that inset.

18 LT. COLONEL HORSTMAN: It is because it's
19 a hard bar road. It's blacktop.

20 MR. SOPER: And the other roads would be?

21 LT. COLONEL HORSTMAN: Dirt roads, and in
22 this case, as you can see from the photography, kind
23 of sandy. And as the judges have driven down there,
24 dusty. They're easier to see from the sky than Skull
25 Valley Road from certain angles.

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1 MR. SOPER: Is that because of the
2 contrast in the surrounding ground, or --

3 LT. COLONEL HORSTMAN: It's contrast and
4 depth of field. You also have line of sight. It's
5 easier to see a road that has visual contrast and is
6 straight, visual contrast with the surrounding area.
7 If it's running perpendicular to your flight path, you
8 don't have the same visual acuity. If there's trees,
9 for example, on the side of the road, it could mask
10 the entire road.

11 MR. SOPER: I would move the introduction
12 of State 223, 222. Excuse me.

13 VOIR DIRE

14 MR. GAUKLER: Lt. Colonel Horstman, you
15 didn't take these photographs yourself. Correct?

16 LT. COLONEL HORSTMAN: That's correct.

17 MR. GAUKLER: Do you know at what
18 elevation these photographs were taken?

19 LT. COLONEL HORSTMAN: No, I do not.

20 MR. GAUKLER: And you don't know at what
21 elevation they depict the areas. Is that correct?

22 LT. COLONEL HORSTMAN: There's no answer
23 to that question.

24 MR. GAUKLER: Okay.

25 LT. COLONEL HORSTMAN: The elevation of

1 the terrain is known. The elevation of the aircraft
2 could be anywhere from 15 to probably 35,000 feet.

3 MR. GAUKLER: And do you know what the
4 magnification of the photographs are?

5 LT. COLONEL HORSTMAN: That was asked
6 before. No. You have a certain amount of clarity and
7 you have a scale, and you work from there.

8 CHAIRMAN FARRAR: Mr. Gaukler, is the
9 purpose of this question, you're trying to find out
10 what altitude we'd be in in a plane where the ground
11 would look like this to us?

12 MR. GAUKLER: Yes, in part.

13 CHAIRMAN FARRAR: Can you answer?

14 LT. COLONEL HORSTMAN: Yes, I think I can,
15 and it's a professional guess. I'd say between 10 or
16 12,000 feet above the ground. And that's just a
17 guess, and if Colonel Fly has a guess, I would
18 probably yield to his.

19 CHAIRMAN FARRAR: Okay.

20 MR. GAUKLER: So basically what you're
21 saying this would be something -- you would guess that
22 it would be something you would see 10 to 12,000 feet
23 above the ground AGL. Is that my understanding?

24 LT. COLONEL HORSTMAN: Yes.

25 MR. GAUKLER: And I think you've said

1 before that typical height to fly through Skull Valley
2 is about three to four above the ground, as we said
3 before?

4 LT. COLONEL HORSTMAN: That's correct, so
5 you would have a better picture from a lower altitude.

6 MR. GAUKLER: Now this is black and white
7 film, I take it, you would agree?

8 LT. COLONEL HORSTMAN: Yes, sir.

9 MR. GAUKLER: And you would get a
10 different picture in color, if you actually had the
11 color. Correct?

12 LT. COLONEL HORSTMAN: If we had the
13 color, I assume you would.

14 MR. GAUKLER: It would also give you more
15 contrast, a better idea in terms of what's down below.
16 Correct?

17 LT. COLONEL HORSTMAN: To the layman, yes.
18 To a pilot, it wouldn't help, and I'll tell you why.
19 All of the target photo study you do every time you
20 have an air-to-ground mission, you use black and white
21 photography just like this. We have a series of
22 hundreds, and hundreds, and hundreds of photographs of
23 targets and turn-points inside the UTTR range complex,
24 and they're all taken just like this. And you use
25 those for target study, so this is what a pilot is

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1 very accustomed to seeing on a daily basis.

2 MR. GAUKLER: And a pilot would be very
3 accustomed to looking out onto the ground from his
4 plane on a daily basis too. Isn't that correct?

5 LT. COLONEL HORSTMAN: That's correct.

6 MR. GAUKLER: And so it's not like as if
7 he'd be seeing something like this for the first time
8 when he flew over it. He would be trained in
9 situations similar to this. He be trained to
10 understand and read features as part of a situational
11 awareness and his training. In other words, it's not
12 as if I go up there and fly for the first time, and
13 gee, I'm lost. Okay?

14 LT. COLONEL HORSTMAN: That's --

15 MR. GAUKLER: A pilot is trained over many
16 years, if I understand correctly, and I understand one
17 would need areas of training in situational awareness.
18 Correct?

19 LT. COLONEL HORSTMAN: That is correct.

20 MR. GAUKLER: And one of the aspects of
21 situational awareness is trying to know where you're
22 at at any point in time. Correct?

23 LT. COLONEL HORSTMAN: That's correct.

24 MR. GAUKLER: And so a pilot would be
25 trained to know where he was on based on situational

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1 awareness like this. Correct?

2 LT. COLONEL HORSTMAN: That's correct.

3 MR. GAUKLER: Do you know what the
4 magnification is on the other pictures on the right?

5 LT. COLONEL HORSTMAN: The scale is
6 present there.

7 MR. GAUKLER: So when you say it's present
8 there --

9 LT. COLONEL HORSTMAN: Each inset has a
10 scale.

11 MR. GAUKLER: And do you have a guess how
12 high you're looking at those insets from the right?

13 LT. COLONEL HORSTMAN: It's just a blow-up
14 of the same image.

15 MR. SOPER: But the question is, what
16 would a pilot think, how many feet above ground he
17 would be? Is that what you're --

18 MR. GAUKLER: That's what I was asking,
19 and he had a professional guess before. I just was
20 wondering what his professional guess was here.

21 LT. COLONEL HORSTMAN: Those are blow-ups.
22 They're inset so -- I'm not sure I understand the
23 question.

24 MR. SOPER: I think he's saying that you
25 made an estimate of how high above the ground you

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1 would be for the large map picture, since they're
2 blow-ups do you have a similar estimate for how high
3 above the ground you might be and see what is shown on
4 the insets?

5 MR. GAUKLER: That's my question. Thank
6 you very much, Mr. Soper.

7 LT. COLONEL HORSTMAN: Well, there's two
8 different scales. The top three and the bottom one
9 have a different one. I would guess, without
10 measuring it, this appears to my eye to be about 2,500
11 vertical feet.

12 MR. GAUKLER: How many?

13 LT. COLONEL HORSTMAN: 2,500 feet above
14 the ground for the top three.

15 MR. GAUKLER: For the top three?

16 LT. COLONEL HORSTMAN: Yes.

17 MR. GAUKLER: What's your basis for that,
18 just a professional guess?

19 LT. COLONEL HORSTMAN: Just a professional
20 guess, that's all. And the bottom one would be about
21 double that.

22 MR. GAUKLER: The bottom one would be
23 what, 5,000 feet?

24 LT. COLONEL HORSTMAN: Yes.

25 MR. GAUKLER: And the bottom one is the

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1 Tekoi Rocket Engine Test Facility?

2 LT. COLONEL HORSTMAN: Yes, sir. It is.

3 MR. GAUKLER: Do you know how the Tekoi
4 Rocket Engine Test Facility compares with PFS in terms
5 of size and features?

6 LT. COLONEL HORSTMAN: Yes, sir. It's
7 larger.

8 MR. GAUKLER: Tekoi is, it's larger than
9 PFS?

10 LT. COLONEL HORSTMAN: If you look at the
11 overview map on the left --

12 MR. GAUKLER: I'm asking about structures
13 and other things of that sort.

14 LT. COLONEL HORSTMAN: Well, let's see.
15 We have a runway set up, basically a sled. You've got
16 a stained part where the heat exhaust is. You've got
17 a series of buildings which appear to be barns and
18 other things, some trees, so I would say that there's
19 probably as much vertical development for this as
20 there would be for the PFS site.

21 MR. GAUKLER: Okay. Do you know how many
22 buildings are going to be on the PFS site?

23 LT. COLONEL HORSTMAN: One big building
24 and casks.

25 MR. GAUKLER: And do you know if it's

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1 going to be administrative buildings, maintenance
2 buildings? Do you know that?

3 LT. COLONEL HORSTMAN: In similar nature.
4 I've seen the -- you know, the basic depiction. It
5 appears to be similar to me.

6 MR. GAUKLER: What -- do you know whether
7 the location of the PFS facility is correct on this
8 map?

9 LT. COLONEL HORSTMAN: I believe it is.

10 MR. GAUKLER: What's your basis for that
11 belief?

12 LT. COLONEL HORSTMAN: We plotted it with
13 coordinates.

14 MR. GAUKLER: And what if I told you that
15 the distance of the Owner Controlled Area from the
16 northern and western part of the reservation
17 boundaries is respectively the same, would that change
18 your opinion?

19 LT. COLONEL HORSTMAN: I didn't understand
20 that.

21 MR. GAUKLER: If I told you that the
22 boundary of the -- northern boundary of the PFSF shown
23 on this map and the western boundary of the PFSF shown
24 on this map are supposed to be equal distant from the
25 northern boundary of the reservation and the western

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1 boundary of the reservation respectively. Would that
2 change your opinion?

3 LT. COLONEL HORSTMAN: No, because if you
4 look at the road intersection, which we know happens
5 to be the boundary, that does not coincide with our
6 dark line overlays we previously discussed.

7 MR. GAUKLER: How much more do you have
8 between the northern boundary of the PFSF site?

9 LT. COLONEL HORSTMAN: I don't know.

10 MR. GAUKLER: It's about double, isn't it?

11 LT. COLONEL HORSTMAN: As I said, are you
12 measuring it against the road, or are you measuring it
13 against the black line?

14 MR. GAUKLER: Either one.

15 LT. COLONEL HORSTMAN It appears to be
16 equidistant between the northern road and the western
17 road, the boundaries.

18 MR. GAUKLER: One quick question. Do you
19 know whether these were taken from an airplane or a
20 satellite?

21 LT. COLONEL HORSTMAN: They were taken
22 from an airplane.

23 MR. GAUKLER: I don't think I have any
24 further questions, Your Honor.

25 MS. MARCO: The Staff has some questions.

1 Sir, you're not an aerial photographer, are you? Are
2 you an aerial photographer?

3 LT. COLONEL HORSTMAN: Not professionally,
4 no. I've taken photographs in the air, and that's the
5 depth of my knowledge.

6 MS. MARCO: And these pictures -- this is
7 -- this large picture is a composite of many different
8 pictures, to your understanding?

9 LT. COLONEL HORSTMAN: Yes.

10 MS. MARCO: And can you please identify
11 which pictures of the large composite picture were
12 taken in 1993?

13 LT. COLONEL HORSTMAN: The darker shaded
14 side on the left, which is about the first 30 percent,
15 25 percent, they were taken in 1993.

16 MS. MARCO: And what is the age of the
17 other two-thirds?

18 LT. COLONEL HORSTMAN: I believe it's
19 1996.

20 MR. SOPER: Actually, they're identified
21 down there. I think it's the other way around.

22 MS. MARCO: Okay. So let's just do that
23 again.

24 LT. COLONEL HORSTMAN: Okay. '98 for the
25 left-hand darker side, and '93 for the lighter right-

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1 hand side.

2 MS. MARCO: And were these taken with 35
3 millimeter film, or was this a digital film?

4 LT. COLONEL HORSTMAN: I don't have an
5 exact answer.

6 MS. MARCO: So you don't know if this film
7 had to be -- had to go through photographic processes.

8 LT. COLONEL HORSTMAN: I do not know.

9 MS. MARCO: Do you -- are you -- do you
10 know the camera that was used to take these pictures?

11 LT. COLONEL HORSTMAN: I do not.

12 MS. MARCO: Do you know the aperture
13 setting of the camera that was used?

14 LT. COLONEL HORSTMAN: I do not.

15 MS. MARCO: Do you know the F-Stop setting
16 of the camera that was used?

17 LT. COLONEL HORSTMAN: I do not.

18 MS. MARCO: So you don't know if these had
19 to be -- had to undergo an enlargement in a dark room?

20 LT. COLONEL HORSTMAN: I do not know.

21 MS. MARCO: And you wouldn't know the
22 contrast filer of that enlarger, do you?

23 LT. COLONEL HORSTMAN: I do not.

24 MS. MARCO: Sir, if you turn to the
25 picture, the one-third showing the -- I think it's the

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1 1996?

2 LT. COLONEL HORSTMAN: 1998.

3 MS. MARCO: I'm sorry, 1998. I see what
4 appear to a layman to be snow capped mountains, but
5 that's not right. Is it?

6 LT. COLONEL HORSTMAN: That's not right.

7 MS. MARCO: And what is it exactly, it is,
8 that that is, that appears to be snow capped
9 mountains?

10 LT. COLONEL HORSTMAN: It appears to me to
11 be sand and rock.

12 MS. MARCO: And sand and rock, is that
13 throughout the entire Skull Valley?

14 LT. COLONEL HORSTMAN: There is some sand
15 and rock, but there's --

16 MS. MARCO: So would that sand and rock
17 also be on the other side of the valley too, looking
18 at the picture?

19 LT. COLONEL HORSTMAN: Over here there
20 doesn't appear to be as much in the Stansbury
21 Mountains, no.

22 MS. MARCO: Would it be anywhere at all on
23 that other side?

24 LT. COLONEL HORSTMAN: You're saying sand
25 and rock, or just the color of light?

1 MS. MARCO: Yes, the sand and rock that
2 would appear in white on that left-hand side?

3 LT. COLONEL HORSTMAN: Well, it appears
4 all over the place in just very, very small pieces.

5 MS. MARCO: It appears to be run-off.
6 Isn't that correct?

7 LT. COLONEL HORSTMAN: Left or right?

8 MS. MARCO: ON the left.

9 LT. COLONEL HORSTMAN: That's sand and
10 rock.

11 MS. MARCO: Now looking down at that
12 square that Judge Farrar first thought was the PFS
13 site, do you see that, sir?

14 LT. COLONEL HORSTMAN: I'm not sure.

15 MS. MARCO: If you look down about
16 halfway, and it's on the edge of the darker to the
17 lighter piece. Do you see that? It's like a C. It's
18 like a C, a capital letter C.

19 LT. COLONEL HORSTMAN: I see that.

20 MS. MARCO: Now if you --

21 MR. TURK: I'm sorry. Could you point to
22 it so we have a common understanding?

23 LT. COLONEL HORSTMAN: Excuse me.

24 MS. MARCO: If you trace that upper line,
25 the upper horizontal line at the C, do you notice a

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1 striking difference between the brightness of that
2 line and where it stops at the edge of that darker
3 segment?

4 LT. COLONEL HORSTMAN: I do.

5 MS. MARCO: And then it continues, does it
6 not?

7 LT. COLONEL HORSTMAN: It continues to
8 Skull Valley Road.

9 MS. MARCO: And it's significantly faded.
10 In fact, wouldn't you say that that blends into the
11 surrounding terrain there?

12 LT. COLONEL HORSTMAN: It's still visible
13 but yes, it does -- it appears that since 1993 until
14 1998, this road has become more prevalent visually.

15 MS. MARCO: But you would say that the
16 rest of the area around that where you have that large
17 black segment, that -- the ground around there hasn't
18 significantly changed, has it?

19 LT. COLONEL HORSTMAN: No.

20 MS. MARCO: And, sir, when you're
21 discussing those four pictures that were blown up, are
22 they exactly the same as the pictures that compose the
23 right-hand side?

24 LT. COLONEL HORSTMAN: The insets are
25 enlargements.

1 MS. MARCO: Of those exact same pictures?

2 LT. COLONEL HORSTMAN: That's my
3 understanding.

4 MS. MARCO: I don't have any other
5 questions. Oh, can you please point out the Pony
6 Express Store on the reservation on that map?

7 LT. COLONEL HORSTMAN: No, I cannot.

8 MS. MARCO: And why is that?

9 LT. COLONEL HORSTMAN: Because I haven't
10 been to it. I flew over it. I couldn't care less
11 where it is.

12 MS. MARCO: Do you know where it is?

13 LT. COLONEL HORSTMAN: I have no idea. A
14 single building? Is there a reason why I probably
15 would know where a single building was?

16 MS. MARCO: Are you aware of any
17 mathematical way that based on the scale you could
18 determine the altitude at which the picture is taken?

19 LT. COLONEL HORSTMAN: I'm not aware.

20 MR. SOPER: Maybe I can add some
21 information. These are standard USGS Federal Service
22 photographs that are maintained on a computer base by
23 the State of Utah, and I think every other state, and
24 they're just put together for whatever period of
25 ground you -- there's nothing magical about these. We

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1 didn't go out and fly them with our own camera and set
2 the F-Stop. They're just USGS photos. I think you
3 find them in any government office.

4 MS. MARCO: Sir, there's --

5 CHAIRMAN FARRAR: I think Ms. Marco is --
6 well, rather than me say what's on her mind, she was
7 about to say what's on her mind.

8 MS. MARCO: I'm sorry.

9 CHAIRMAN FARRAR: Oh, no.

10 MS. MARCO: I'm saying that although it
11 may not -- it may be USGS photos, but these are being
12 offered to show contrast, he said. And contrast is a
13 major element of what can be seen, and if they are not
14 produced, and they don't demonstrate that, then they
15 are of little value.

16 CHAIRMAN FARRAR: And what I was going to
17 say was whether they're taken from a satellite at
18 whatever level, or from a plane, once they're
19 committed to an exhibit, they represent something in
20 terms of what a pilot or the Board would see at a
21 certain elevation in an airplane, which may or may not
22 be part of Mr. Soper's reason for presenting it. But
23 I think Ms. Marco's questions were getting to where --
24 the question I asked before, at what altitude would
25 we be when the ground looked like this.

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1 MR. GAUKLER: That was my question too,
2 Your Honor.

3 CHAIRMAN FARRAR: Okay. All right. Is
4 voir dire completed? Then we have pending a motion to
5 introduce this exhibit. Mr. Gaukler.

6 MR. GAUKLER: I object for the grounds
7 already stated by Ms. Marco, that it doesn't -- we
8 don't know what it represents. We don't know the
9 elevation which it's at. We don't know what this
10 represents in terms of where you would see it, what
11 you would see from a particular elevation. And also,
12 just in terms of the contrast, as Ms. Marco has said,
13 they contrast very sharply. We don't know which one
14 is the correct one. That by itself would lead me to
15 think we should not introduce it, so I don't think
16 that we should introduce it for those reasons.

17 CHAIRMAN FARRAR: Ms. Marco.

18 MR. GAUKLER: I would just add that, you
19 know, also we discussed, we have not had a chance to
20 check on any of these things ourselves independently,
21 is another reason why we make these objections.

22 CHAIRMAN FARRAR: Ms. Marco.

23 MR. TURK: Your Honor, I think if I might,
24 I'll present the argument, if Ms. Marco doesn't mind.
25 The points made in voir dire are very good points. I

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1 think Mr. Soper has done a commendable job of
2 attempting to obtain aerial photographs of the area.
3 It would be very interesting if we could see aerial
4 photographs that correctly represent what we would see
5 on the ground if we were a pilot flying through Skull
6 Valley. You don't have that here.

7 What you have is a poor contrast in black
8 and white, photographs that were a composite taken at
9 different times, with different contrasts shown even
10 in the exhibit. It's not what a pilot sees. A pilot,
11 like the rest of us, has color vision. He would be
12 able to discern features that don't show up here
13 because it's black and white. He would also be able
14 to discern things at the correct elevation that don't
15 show up here. Mr. -- I'm sorry. Lieutenant Colonel
16 Horstman himself has indicated that his best guess is
17 that the main photo was taken at three times the
18 height of where a pilot would be in Skull Valley, if
19 he's correct. We have not yet done the mathematical
20 calculation, but we believe that actually the pilot
21 would be -- that these photographs were taken from a
22 much higher elevation, or at least what is depicted
23 here would be what you would see if you were at a
24 substantially higher elevation than the witness has
25 indicated. We would have to do the math in order to

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1 get you a correct number, to tell you what we think
2 the correct representation is.

3 The exhibit is not useful to show you what
4 a pilot would see in Skull Valley. It's simply a
5 depiction, as Mr. Soper indicated, of where things are
6 relatively speaking, but we don't need that. That's
7 not the issue before you. The issue is what does a
8 pilot see. If we had a better aerial photograph, that
9 would be useful, but we don't. And this one, I think,
10 does not establish anything that's useful for the
11 case.

12 CHAIRMAN FARRAR: Mr. Soper.

13 MR. SOPER: As Mr. Turk correctly points
14 out, the relative location of the various ranches,
15 Goshute Village, Rocket Test Facility and so forth, a
16 picture is worth a thousand words in demonstrating
17 relatively where they are in this vicinity. The
18 question is, is this truly an unoccupied desert area,
19 or are there some things out there? And again, I
20 think that the Applicant, one of the first things he
21 should have presented to us is a picture of this, and
22 if you look at the contrast of the main road running
23 east to west across there, across both sets of
24 photographs; in other words, there's the '93 and the
25 '98 set, you see the bright line of the road running

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1 right across both sets, so I -- to say that this is
2 not useful for anything, I think is just totally
3 incorrect.

4 I don't know why people don't want to have
5 a representation of what's out there. It's there.
6 Find a map that we can't nitpick, including the ones
7 that we're using here.

8 MR. GAUKLER: I just wanted to say that
9 the Applicant has put forth many maps in its
10 application, and location, premises, et cetera, so
11 none of that has been a secret.

12 CHAIRMAN FARRAR: Not a secret from the
13 Staff and the public. Mr. Soper's point is that what
14 are we seeing, we being the Board.

15 MR. GAUKLER: Well, I know you have copies
16 of the application available, whether they're from a
17 part of the record or not. They are in the
18 application. You can find them in the environmental
19 report, for example. I'm just making the point that,
20 you know --

21 CHAIRMAN FARRAR: I'm not saying we've
22 never seen the application, or the environmental
23 report, as we've labored through the case. Mr.
24 Soper's question is -- I think he's saying there's no
25 exhibit in the case presented to us that has a

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1 photograph like this, which that's his point. That
2 doesn't mean that's good, bad, or indifferent.

3 MR. GAUKLER: Right.

4 CHAIRMAN FARRAR: That's his point in
5 support of this, is this is all there is that would be
6 official in front of us. Well, let us --

7 JUDGE LAM: Mr. Soper, now this map, do
8 you intend to demonstrate that this is something a
9 pilot would see flying out there at an unspecified
10 elevation?

11 MR. SOPER: No, I don't, Your Honor. And
12 we don't claim that this is -- although Lieutenant
13 Colonel Horstman offered his view, that this -- or his
14 opinion that this is maybe from -- I forgot what he
15 said now, 12,000 feet or so.

16 MR. TURK: He said 15,000 to 35,000.

17 MR. SOPER: I think he said it was taken
18 at that altitude.

19 CHAIRMAN FARRAR: He said 10 to -- I
20 thought he said 10 to 12.

21 MR. SOPER: Ten to twelve thousand feet.
22 We don't intend to claim anything for that. The scale
23 of this, and the view that -- or the altitude which it
24 may represent was strictly adjusted so that we could
25 see what are the structures located in this area. And

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1 that's all we're concerned with.

2 In other words, if there were some --
3 within the three mile area or so that a pilot would
4 have to be concerned with, with a failed engine.
5 What's around there in that particular range? If we
6 were dealing with 15 miles we would have, maybe, asked
7 the map maker to back-way a little further and see
8 what's there. Obviously, we don't want it so high
9 that we can see Salt Lake City and the Great Salt
10 Lake, but we just wanted to take a look and see what
11 are the relative ground sites around PFS from a
12 distance that we can get them all on one map. And we
13 had to make kind of a big map to do that. It's only
14 a relative -- we're only interested in what are the
15 relative locations of things from each other.

16 JUDGE LAM: So your intention was just to
17 illustrate where the relative locations are without a
18 great deal of precision.

19 MR. SOPER: Yes, although I think the
20 relative locations are -- it's a photo, so I think
21 they're quite precise. I mean, you can enlarge or
22 blow-up, or reduce the size of a photo, and the houses
23 or whatever it shows are still relatively the same
24 distance apart, and that's all we attempt to
25 accomplish here.

1 JUDGE LAM: That's true. By precision I
2 meant how that map was created, as to elevation, angle
3 of contrast, et cetera, et cetera, because that has
4 not been established. We don't know what elevation.

5 MR. SOPER: Yes, that's right. Like I
6 say, they're just standard photos maintained in a
7 computer database.

8 MR. TURK: Is there any intent to rely on
9 the visibility of Skull Valley Road which has been
10 blacked out by the State's --

11 MR. SOPER: No, other than in the inserts
12 there when you can see the road and the other roads,
13 it sort of demonstrates that some roads have a better
14 contrast. And I think that that's already been
15 testified to, but that's all we intend to offer this
16 for.

17 CHAIRMAN FARRAR: Okay. I think we've
18 heard -- Mr. Gaukler.

19 MR. GAUKLER: I just want to make one very
20 quick point, that we did describe what was in the
21 vicinity of the PFSF in terms of Goshute Village and
22 ranches in our testimony.

23 CHAIRMAN FARRAR: No, no, no. And we've
24 been -- remember we've been there so, I mean, we have
25 in our mind what it looks like all the way down from

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1 the Interstate. We have what it looks like from the
2 ground to the extent of visibility was not obscured by
3 the dust.

4 MR. TURK: I would note, you also have the
5 final Environmental Impact Statement, which is in the
6 record as Exhibit E for the Staff, which does have
7 photographs of the location. It also has a map of the
8 nearest residence relative to the facility, which we
9 introduced separately as an exhibit when we were
10 talking about those calculations, so that is in the
11 record already.

12 CHAIRMAN FARRAR: Okay.

13 MS. MARCO: And, Your Honor, I think that
14 I would object to this document that comes in to show
15 Skull Valley Road, even in the little pictures,
16 because the little pictures are based on the poor
17 contrast left-hand -- right-hand side of the map.
18 They're the same picture.

19 (Judges confer.)

20 CHAIRMAN FARRAR: We're going to defer
21 action on the motion and the objections until we see
22 where the questioning goes, and have a very clear
23 understanding of, based on that, what the purpose of
24 the admission of the photograph would be, because it
25 obviously, as has been pointed out, has a great deal

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1 of limitations. It may be legitimate for some limited
2 purposes, and it may be illegitimate for others, so we
3 will carry -- keep that matter under advisement until
4 we're better informed, and then we'll hear briefly
5 from you again before we make a ruling.

6 Moving right along, it's now noon. We've
7 made essentially no progress since 3:30 yesterday on
8 getting -- giving Mr. Soper the two hours that he
9 needs to ask questions, but these are obviously
10 important questions, and let's move on. It's -- well,
11 actually, it's 10 after 12. Mr. Soper, do you want to
12 try to get some examination done before lunch, or now
13 that we know where we stand, or don't stand on all
14 these, would you like to reorganize over lunch? It's
15 up to you.

16 MR. SOPER: That might be efficient,
17 actually, Your Honor.

18 CHAIRMAN FARRAR: All right. Anybody have
19 a better idea? Then it's 10 after 12. Let's be back
20 at -- Mr. Soper, will 1:15 give you enough time to eat
21 and get organized?

22 MR. SOPER: Yes.

23 CHAIRMAN FARRAR: Or would you like a
24 little more time?

25 MR. SOPER: 1:15 is fine.

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1 CHAIRMAN FARRAR: Okay. Then we'll be
2 back at 1:15.

3 (Whereupon, the proceedings went off the
4 record at 12:10: p.m. and resumed at 1:18 p.m.)

5 CHAIRMAN FARRAR: Mr. Gaukler, Mr. Soper,
6 do you want me to wait for your co-counsel?

7 MR. SOPER: No, not as far as I'm
8 concerned.

9 MR. GAUKLER: Not as far as I'm concerned.

10 CHAIRMAN FARRAR: Okay. Then let's get
11 started. Go ahead, Mr. Soper.

12 MR. SOPER: Thank you, Your Honor. My
13 recollection was that the State had moved that State
14 Exhibit 222 be admitted into evidence, and I'm not
15 sure if everyone has made their objections.

16 CHAIRMAN FARRAR: Wait, 222 is?

17 MR. SOPER: The map.

18 CHAIRMAN FARRAR: We had deferred a
19 decision pending seeing where you're -- that you can
20 question on it, and then at the end of your
21 questioning, we would have the objections be renewed.
22 By then, we'd have a better understanding of what
23 you're going to attempt to use it for, given its --
24 the level of its infirmities, and make a decision
25 then.

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1 MR. SOPER: Okay. Thank you for
2 refreshing me on that.

3 CONTINUED DIRECT EXAMINATION

4 MR. SOPER: Lieutenant Colonel Horstman,
5 referring to Exhibit 222, can you see on there, sir,
6 the relative location of various sites in Skull
7 Valley, such as the PFS proposed site, the Indian
8 reservation, Indian Village and the Rocket Test
9 Facility, things like that?

10 LT. COLONEL HORSTMAN: Yes, sir. I can.

11 MR. SOPER: And the -- you can also see
12 some roads on there?

13 LT. COLONEL HORSTMAN: Yes, sir. There
14 appear to be a couple of dozen roads.

15 MR. SOPER: And in your view, is that map
16 of assistance in understanding what the particular
17 features are in Skull Valley, and their relative
18 location from each other?

19 LT. COLONEL HORSTMAN: Yes, sir. Because
20 we use this type of imagery on a regular basis, it's
21 familiar-looking. I know what to look for when I'm
22 planning a mission, so yes, it represents what we're
23 expected to see.

24 MR. SOPER: And if a person was trying to
25 determine what a pilot might have -- be confronted

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1 with in an ejection decision, there are some sites on
2 there, are there not, that would represent things that
3 a pilot might see, particularly when flying at a lower
4 altitude?

5 LT. COLONEL HORSTMAN: Yes, sir. And I
6 guess I should reference that by, I'll just call it 3
7 to 4,000 feet AGL for discussion purposes. In the
8 north end, there's a series of agricultural fields
9 with 90 degree lines very visibly perceptible,
10 different colors. There are the farms. There is the
11 village, and there is the Rocket Motor Test site.

12 Probably the most significant features on
13 this, I would cross-reference with a map. The maps
14 that PFS has submitted, one of them is right here, and
15 it correlates real well, except on the map there is a
16 single road.

17 MR. SOPER: And when you say "on the map
18 there's a single road", you're referring to exhibit?

19 LT. COLONEL HORSTMAN: KKK or something
20 like that.

21 MR. SOPER: One of the PFS exhibits that
22 shows a -- how would you describe that?

23 LT. COLONEL HORSTMAN: It's one of 250,000
24 topographical map for flying purposes.

25 CHAIRMAN FARRAR: With the lake up in the

1 right-hand corner?

2 LT. COLONEL HORSTMAN: Yes, and the
3 Interstate and the Sevier B MOA depicted, as well. It
4 shows that we have a single road, so if I were to look
5 at the map, I would expect to see the Interstate up
6 north. I would expect to see this hardball road.
7 Without looking at an image like this, that's what I
8 would expect.

9 There are some ranches located basically
10 three on this whole 20 mile or so segment, so I would
11 expect to see a driveway. In fact, what I see is a
12 couple of dozen roads, some are well defined, some are
13 not. That definition will be dependent upon the
14 weather, the sun angle, the clouds, whether or not it
15 rained last night, whether or not it snowed last
16 night, how many clouds are between me and the ground,
17 so all of those things would come into play. But the
18 significant difference is that now I have more
19 information than from the map. This is no longer a
20 depiction. This is an image, so I would be able to
21 now notice that I have two dozen roads, instead of
22 just one. If I were looking for a specific road, I
23 would know that there are intersections instead of
24 just a single blacktop road which is 40 feet wide or
25 so.

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1 MR. SOPER: If you were to look at the PFS
2 exhibit, the map that you've referred to there, that
3 shows a single road, and were to rely on that as to
4 the features in Skull Valley, would that be misleading
5 without a map like Exhibit 222, to add more detail?

6 LT. COLONEL HORSTMAN: No, sir. I don't
7 think it's misleading at all. I think it's
8 incomplete. We know that there's a ranch, or there
9 used to be a ranch. It turns out that the ranch on
10 top of the 640 foot knoll I've looked for a dozen
11 times, and I've never seen it, so all of those may be
12 dated, but the roads would last longer than a
13 structure. And the map provides me with very good
14 initial planning. I think for more precise
15 information, I'd have to go to an image or a much
16 higher scale map to show me that there are, in fact,
17 lots of other roads. So it's very helpful. It's just
18 incomplete.

19 MR. SOPER: I see. And you're referring
20 to the previous map that's been in evidence by PFS.

21 LT. COLONEL HORSTMAN: Yes, sir. The map
22 versus the image.

23 MR. SOPER: So to realize that there's
24 additional roads and additional ground features, you
25 would need an image like shown in Exhibit 222?

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1 LT. COLONEL HORSTMAN: That's correct.

2 MR. SOPER: And are those features that
3 you pointed out, the fields and the Indian Village,
4 are those accurate representations of what they, in
5 fact, look like from the air?

6 LT. COLONEL HORSTMAN: Relatively. You're
7 looking at a bird's-eye view, and as opposed to a
8 3,000 foot vertical slant range, so you would still
9 see the geometric shapes. You would see the different
10 color. At 10,000 feet the ground is black and white.
11 There's no color to it, so it is a little bit
12 different. It would be different seasonally, but it
13 represents what I would expect.

14 I would expect a different look from the
15 farm land in the spring and the fall, and the winter.
16 If the furloughs were aligned with my flight path and
17 there was some snow, I would expect to see them. And
18 if they were perpendicular, I wouldn't expect to see
19 them, so there's a lot of things you can pick up here.

20 MR. SOPER: So you're saying no matter
21 what the photograph of the actual Skull Valley is, it
22 could not depict every weather condition, snow,
23 clouds, seasons, any single photograph would be
24 incomplete in some respect.

25 LT. COLONEL HORSTMAN: That's correct.

1 Let me give you just a brief example. Let me show you
2 with an overcast sky what it would look like.

3 MR. SOPER: The record can show he's
4 turned the exhibit over so that we can't see anything.

5 LT. COLONEL HORSTMAN: Just white. I see
6 nothing, so there are seasonal variances. There are
7 time of day, sun angle, weather, a variety of things
8 which would impact how this would look.

9 MR. SOPER: Nevertheless, 222 is a
10 reasonably accurate portrayal of the relative
11 locations of the features in Skull Valley?

12 LT. COLONEL HORSTMAN: I believe so, yes.

13 MR. SOPER: That's all that we would have
14 on that, Your Honor. And we would offer it.

15 CHAIRMAN FARRAR: If that's all you're
16 going to have, why don't we defer any further argument
17 and so forth on it, and just keep going with your
18 direct exam.

19 MR. SOPER: Thank you.

20 CHAIRMAN FARRAR: Rather than interrupt it
21 and have both parties ask questions, and then hold
22 more argument. Let's keep going with the evidence.

23 MR. SOPER: I would like to have the
24 document that I handed out earlier today marked as
25 State Exhibit 223, entitled "Analysis of Mishap

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1 Reports Shown on Applicant's Exhibit 100."

2 CHAIRMAN FARRAR: All right, Mr. Soper.
3 That's been marked.

4 MR. SOPER: Lieutenant Colonel Horstman,
5 do you have what's been marked as Exhibit, State
6 Exhibit 223 before you, sir?

7 LT. COLONEL HORSTMAN: What's the title,
8 please?

9 MR. SOPER: It's entitled, "Analysis of
10 Mishap Reports Shown on Applicant's Exhibit 100."

11 LT. COLONEL HORSTMAN: I have a copy of
12 that.

13 MR. SOPER: Is this a document you
14 prepared or furnished the information for the
15 preparation of?

16 LT. COLONEL HORSTMAN: Yes, sir.

17 MR. SOPER: And does this document contain
18 the description of the same 59 accident reports that
19 were shown in the PFS Exhibit 100?

20 LT. COLONEL HORSTMAN: Yes, it does.

21 MR. SOPER: And I might indicate that
22 that's now been corrected to Exhibit 100A, and I
23 believe we've made a correction as to one of the dates
24 that appeared on Exhibit 100. Is that right? One of
25 the mishap dates?

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1 LT. COLONEL HORSTMAN: Yes.

2 MR. SOPER: And which mishap was that?

3 LT. COLONEL HORSTMAN: Number 11.

4 MR. SOPER: And PFS Exhibit 100 had the
5 date in number 11 as 24 Feb, '94. Is that correct?

6 LT. COLONEL HORSTMAN: That's correct.

7 MR. SOPER: And I see you've changed that
8 to 2 Feb, '94. Is that right?

9 LT. COLONEL HORSTMAN: Yes.

10 MR. SOPER: And if I might go across the
11 columns, on the far left you have just a single
12 number. Is that the same number that the report was
13 given on Exhibit 100?

14 LT. COLONEL HORSTMAN: Yes, it correlates.

15 MR. SOPER: And the second column under
16 "Mishap Date", that is what purports to be the date of
17 the accident?

18 LT. COLONEL HORSTMAN: That's correct.

19 MR. SOPER: And the "Mishap Facts", is
20 that your summary of the facts that you believe
21 relevant to our inquiry here?

22 LT. COLONEL HORSTMAN: Yes, it is.

23 MR. SOPER: "Ejection Altitude AGL", tell
24 us what appears in that column.

25 LT. COLONEL HORSTMAN: We reviewed all the

1 accident reports and found the actual ejection
2 altitude above ground level, if it was given somewhere
3 in the report, and we've listed that in this column.

4 MR. SOPER: And the final column headed
5 with the words, "Shows Ability To Avoid Ground Site,
6 such as PFSF."

7 LT. COLONEL HORSTMAN: That's correct,
8 sir.

9 MR. SOPER: And then I notice an asterisk,
10 and at the very last page at the bottom there is also
11 an asterisk. Does that explain the parameters that
12 you used to determine whether or not a mishap fit the
13 heading of, "Shows Ability to Avoid Ground Site, such
14 as the PFSF"?

15 LT. COLONEL HORSTMAN: Yes, sir. It also
16 further states the delineation between attempting to
17 land the aircraft, as opposed to avoiding something.

18 MR. SOPER: Okay. Before we start this,
19 can you explain what you mean by that reference,
20 differentiating between "attempting to land", and
21 "attempting to avoid"?

22 LT. COLONEL HORSTMAN: Yes, sir. If you
23 look at part of the definition of "able to avoid", in
24 which the pilot retained control and had enough time
25 to avoid a specific site. And if you look at a number

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1 of the Exhibit 100A, they talk about the pilot flying
2 the aircraft, turning the aircraft, zooming the
3 aircraft. They talk about aiming towards an emergency
4 airfield, and they also talk about avoidance.

5 In my mind, based on all my training, and
6 the way the aircraft avionics is set up, there's a
7 distinct difference between trying to land the
8 aircraft, and trying to avoid something on the ground.
9 The fact that an aircraft is flyable, may or may not
10 mean that the pilot has the ability or has the desire
11 to avoid an object on the ground.

12 When we reviewed the database of these 59
13 accidents, we found that over 50 percent of these 59
14 accidents, the maneuvering was directed towards an
15 emergency airfield. And that's critically important
16 because there are three in the local area in Utah.
17 One is Hill Air Force Base, one is Michael's Army
18 Airfield, and one is Wendover Airfield. And those are
19 three steer points that are pre-selected in a standard
20 navigation package in your mission planning material
21 that you program the aircraft. You basically download
22 some data into the airplane, and you have -- it's
23 generally five emergency steer points. I don't know
24 what the numbers are now, if there's been a software
25 update, but it used to be number 21 through 25, I

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1 believe. And you could merely select that, and you
2 would have the radio and bearing to that emergency
3 airfield.

4 MR. SOPER: So that is something that's
5 done in advance of the flight, in case there's an
6 emergency. All you would do is push a button and that
7 would change the steer point to the emergency landing
8 field?

9 LT. COLONEL HORSTMAN: Yes, sir. You push
10 a couple of buttons, but yes. You would just select
11 your point 20, or 21, or 23, or whatever the number of
12 that one is. We don't use Salt Lake City as an
13 emergency airfield, although we could. We choose not
14 to because when you leave Hill, Michael's is the next
15 best stepping stone. And as I said, those are pre-
16 planned, and they come in every DTC data transfer
17 cartridge load.

18 MR. SOPER: Now when you say "emergency
19 airfield", does that include the field that you just
20 departed from, for example?

21 LT. COLONEL HORSTMAN: Yes, sir, it does.
22 As I said, Hill Air Force Base would be one of them.
23 In a normal navigation you wouldn't really want or
24 need to know where exactly Hill Air Force Base was
25 until it was time to land, and you'd find it visually

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1 or through instruments to land on it. You're not
2 allowed to land with that navigation system at the
3 base. If the weather is bad, you'd have to actually
4 use instrument procedures per FAA, so you wouldn't
5 normally need to know where Hill Air Force Base is.
6 However, it's an emergency field so that if right
7 after take-off, if you chose to go back, you either
8 would be visual with it, or you could select that
9 steer point and know your radial and DME.

10 And in some of the accidents they discuss
11 control bail-out areas, et cetera. That would be
12 another way to define those, another navigation
13 reference point.

14 MR. SOPER: So any airfield you return to
15 would be referred to as an emergency airfield for the
16 reason that you're under emergency.

17 LT. COLONEL HORSTMAN: Yes, sir. As soon
18 as I took off, any airfield that I chose to land at
19 would be an emergency airfield unless my mission went
20 perfectly normal. I came back and land without
21 emergency.

22 As I said, we took a look, and in over 50
23 percent of the accidents showed a distinct and
24 definite maneuver towards an emergency airfield. And
25 that corresponds with the training that a pilot

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1 receives.

2 As General Cole specified, the first three
3 things a pilot does in an accident is maintain
4 aircraft control, analyze the situation, land as soon
5 as the conditions permit, or with other -- land as
6 soon as practical. The last one is modified, but it's
7 a standard throughout the entire aviation industry.
8 Get the airplane on the ground, and then get it fixed
9 if there's a problem. So those are the things that
10 you would think about before you would do any of the
11 other kind of activities associated with emergencies,
12 such as shutting down an engine, or recycling a
13 hydraulic. You would be going to your landing
14 airfield. That would be the first thing that most
15 pilots would do. In the case of over 50 percent of
16 these 59 accidents, that's what they did.

17 MR. SOPER: Does that indicate anything
18 about trying to avoid a site on the ground?

19 LT. COLONEL HORSTMAN: On the contrary, it
20 indicates nothing about trying to avoid a site on the
21 ground. It indicates that the pilot is intending to
22 continue to fly the airplane and land it. And if you
23 land at Michael's Army Airfield, as Colonel Fly said,
24 call a cab and go back to Hill. There's nothing in
25 there about avoiding any of this stuff. It's all

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1 about trying to get to an emergency airfield. You
2 land the airplane, and then worry about it later, sell
3 it to maintenance.

4 MR. SOPER: If I might ask you about the
5 very first entry here, the mishap dated 26 December,
6 '89. In the body of the mishap facts, in quotes which
7 I take it means the aircraft mishap report is being
8 quoted. It says, "The pilot intentionally delayed
9 ejection below minimums recommended in T.O.1F-16C-1,
10 to further avoid populated areas in his flight path."

11 What's your understanding of why the pilot
12 intentionally went below the 2,000 foot minimum to
13 avoid a populated area?

14 LT. COLONEL HORSTMAN: Because he could
15 not avoid it from above 2,000 feet.

16 MR. SOPER: And going below 2,000 feet is
17 a violation of the safety procedures. Is that right?

18 LT. COLONEL HORSTMAN: The flight manual,
19 which is the Dash-One, safety procedures, common
20 sense. There's no hope for an engine restart, and
21 that's in a controlled situation, the altitude is
22 higher. At 6,000 feet in an uncontrolled. The book
23 states eject above 2,000 feet. There were some
24 problems, apparently. We heard previous testimony
25 that while there's an ALSAFECOM that says pilots are

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1 ejecting below that, General Cole said it was fixed.
2 It turns out that in these 59 accidents, 59 percent of
3 these ejections that occur in flight, not on the
4 ground, are below 2,000 feet, so all of the training
5 we've listened to and discussed doesn't appear to be
6 working.

7 MR. SOPER: And that's also the message of
8 Colonel Bernard's safety video, is it not?

9 LT. COLONEL HORSTMAN: Precisely the same
10 thing. If the Chief of Safety is putting out
11 something that he's concerned about, you would think
12 that there would be more attention paid to it, and
13 that that problem would be fixed, as General Cole
14 indicated. It, apparently, is worse than it was
15 before in this database of 59 accidents.

16 MR. SOPER: Calling your attention to the
17 second entry there, 20 September, '90, is there any
18 reference in the accident report to the pilot, either
19 locating a particular ground site, or steering away
20 from a ground site?

21 LT. COLONEL HORSTMAN: No, sir, there's
22 none. Other formation members have said some words in
23 there, and the pilot does make a maneuver. We have no
24 indication of why he made that maneuver, so I don't
25 assume that he was trying to avoid anything. I'm

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1 assuming he's trying to pick a better place to land.
2 I don't know.

3 MR. SOPER: The entry number 3, the body
4 of the facts says that, "The F-16 developed a fuselage
5 fire which grew in intensity until the pilot ejected
6 over Everglades National Park." Any indication there
7 that the pilot saw any ground site, or made any
8 maneuver away from it?

9 LT. COLONEL HORSTMAN: No, not at all.
10 And if you read 100A on that one, "Decided to eject
11 over an unpopulated area." I've been over the
12 Everglades. There's no populated area down there, so
13 it must have been a pretty easy task, since there's no
14 populated areas in the middle of the Everglades, so I
15 see nothing that he was attempting to avoid.

16 MR. SOPER: Now in entry number 4, it says
17 that, "The engine failed at 16,000 feet above ground
18 level." In that particular case, the pilot tried to
19 glide to an emergency airfield?

20 LT. COLONEL HORSTMAN: That's correct.

21 MR. SOPER: And I take it, he did not make
22 it to the emergency airfield?

23 LT. COLONEL HORSTMAN: That's correct.
24 And I don't have as many -- hang on one second. Let
25 me cross-check. If you read the body of the accident

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1 in this one, Exhibit 100A says, "Descended through
2 weather to clear flight path before ejecting." In
3 fact, what this guy was trying to do was land. He put
4 the landing gear down to land the airplane and he blew
5 it. He put the gear down too quickly, too much drag,
6 so he couldn't make the airfield, so he's pointing at
7 a runway, putting his landing gear down without an
8 engine. His glide time is significant. He's
9 descending at 12, 13, 14 hundred feet per minute.
10 He's going to go down well over 10,000 feet, lots of
11 time. And he's violating the rules by trying to
12 descend visually through the weather to land, against
13 the rules again.

14 He gets below the weather. Ooops, can't
15 make it. I'll put the landing gear up. Maybe I can
16 then achieve the landing field. No, can't do that.
17 Now he's too low to make any decisions, so is he
18 avoiding or is he going towards a landing field? He
19 jumps out at 300 feet above the ground. He made a
20 significant number of mistakes in this case.

21 MR. SOPER: Now you've made some reference
22 to "he cleared his flight path", did you say?

23 LT. COLONEL HORSTMAN: That's what they
24 say.

25 MR. SOPER: Any indication that there was

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1 any ground site that he saw?

2 LT. COLONEL HORSTMAN: No, there's no
3 indication that he avoided anything.

4 MR. SOPER: The next entry, number 5, any
5 indication there that the pilot steered away from a
6 ground site?

7 LT. COLONEL HORSTMAN: No. The radar site
8 is a misnomer because he just continued his turn
9 towards downwind to land the airplane. The fact that
10 there was a radar site going in front of him is
11 irrelevant. He's ejecting at 506 feet above the
12 ground. The aircraft is in some bank, and he is
13 attempting to avoid at well below 2,000 feet. I don't
14 see specifically what he was trying to avoid. It
15 doesn't say that, so am I to assume that it was -- I
16 don't know.

17 MR. SOPER: It says in the bottom there in
18 quotes, "Attempted to stretch the glide path out
19 toward and over Lake Ogawara." I may be pronouncing
20 that wrong. In fact, did he stretch the glide path
21 out and over the lake?

22 LT. COLONEL HORSTMAN: No, he landed
23 straight, impacted short.

24 MR. SOPER: Anything about this accident
25 that would show the ability to avoid a ground site,

1 such as PFS?

2 LT. COLONEL HORSTMAN: Nothing, sir.

3 MR. SOPER: If we look at number entry 6,
4 it says there in quotes that, "The pilot attempted to
5 point the aircraft away from population centers, and
6 ejected at less than 500 feet." Did the -- was the
7 pilot successful in attempting to point away from
8 population centers?

9 LT. COLONEL HORSTMAN: No, he was not.

10 MR. SOPER: In fact, the aircraft hit and
11 destroyed a house. Is that correct?

12 LT. COLONEL HORSTMAN: That's correct.

13 MR. SOPER: The next entry, number 7,
14 shows that the engine failed at 21,000 feet. Is that
15 correct?

16 LT. COLONEL HORSTMAN: That's correct.

17 MR. SOPER: At that altitude, the aircraft
18 had 14 minutes flying time prior to impact?

19 LT. COLONEL HORSTMAN: That's correct.

20 MR. SOPER: And that was due to the fact
21 that he was so high when the engine failed?

22 LT. COLONEL HORSTMAN: Yes. It also goes
23 on to say that -- the PFS exhibit says that, "He
24 turned away from populated areas." In fact, he almost
25 hit populated areas, and apparently didn't know that.

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1 We see no indication that he tried to avoid impacting
2 two inhabited dwellings near the site, didn't know
3 anything about them. And this is after over 10
4 minutes of flying, trying with lots of opportunity to
5 point your airplane somewhere, as the Applicant would
6 -- the safest possible place, or land in the
7 Beautyrest Mattress or whatever. Didn't happen.

8 MR. SOPER: And this is the, I notice the
9 first ejection that occurred at 2,000 feet.

10 LT. COLONEL HORSTMAN: In this database,
11 yes.

12 MR. SOPER: Now entry number 8, there's an
13 engine failure caused by a 2.5 pound bird. Is that
14 correct?

15 LT. COLONEL HORSTMAN: That's correct.

16 MR. SOPER: And after the bird was
17 ingested by the aircraft, the aircraft caught fire.
18 Is that right?

19 LT. COLONEL HORSTMAN: That's correct.

20 MR. SOPER: Can you tell us about, was
21 that aircraft controllable?

22 LT. COLONEL HORSTMAN: No, and it brings
23 up a good point, because in Tab H, it states, the
24 "able to avoid" discussion, "All engine failures,
25 regardless of where they happen, left the pilot with

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1 the time and capability to avoid the PFSF."

2 If the aircraft is out of control, the
3 pilot is not in control. He doesn't have the ability
4 to aim it anywhere, or to not aim it anywhere, so if
5 a pilot is going to turn the aircraft to an emergency
6 airfield, he may have control for a certain period of
7 time. If then the aircraft goes out of control and
8 doesn't respond to pilot control inputs, it's out of
9 control, so --

10 MR. SOPER: What is Tab H that you're
11 referring to there?

12 LT. COLONEL HORSTMAN: It's the "Relevant
13 Percentage of F-16 Crashes In Which the Pilot Retains
14 Control of the Aircraft", and it discusses PFSF -- or
15 PFS found that, "All of the engine failures, even the
16 catastrophic ones, and regardless of where they
17 happened, left the pilot with the time and capability
18 to avoid the PFS site." That appears to be a mistake,
19 because in this example, the aircraft is out of
20 control after an engine failure, so he has no
21 capability to maneuver the aircraft towards anything
22 or away from anything. The only thing the pilot can
23 do at this time is eject and land, and go back. I
24 mean, it's over, so I don't see how they even think
25 that this can be an avoidance maneuver.

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1 MR. SOPER: Now PFS Exhibit 100 doesn't
2 have any reference to the aircraft being out of
3 control, or being on fire. What does the mishap
4 report say about the aircraft's direction?

5 LT. COLONEL HORSTMAN: I don't have a copy
6 of that with me right now.

7 MR. SOPER: After ejection, well, there's
8 a reference in the mishap summary on your exhibit.

9 LT. COLONEL HORSTMAN: I have a bad copy
10 of the top of that page. I'm sorry. "After ejection
11 with still burning aircraft, turned about 72 degrees
12 further right, rolled beyond inverted and impact.
13 Pilot was unable to control the aircraft." Actually,
14 the quotes -- let me rephrase that.

15 "The still burning aircraft turned about
16 72 degrees further right, rolled beyond inverted and
17 impacted." That's from the accident report. We
18 talked about that yesterday. There is absolutely --
19 you can't even stretch your imagination far enough to
20 think that this pilot was in control of the airplane.

21 MR. SOPER: Now entry number 9 shows that
22 the pilot ejected at 50 feet. Is that correct?

23 LT. COLONEL HORSTMAN: That's correct.
24 This was the Colonel Cosby one. They claim in Exhibit
25 1-A that he landed on Selfridge Air Force Base. I

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1 believe the correct term would be "crashed" on
2 Selfridge Air Force Base. In fact, most of his -- in
3 the accident report, most of the maneuvers he was
4 doing were exactly as he was supposed to, to bring the
5 aircraft back around and land. He was an FCF pilot,
6 should have been able to land the airplane and didn't,
7 because he was making a series of mistakes.

8 Subsequently, he realizes that we have
9 problems and we have to avoid things. And as we heard
10 in his testimony, he did an absolutely magnificent job
11 of avoiding things, and an absolutely magnificent job
12 of breaking the rules in order to do so.

13 MR. SOPER: It says here that, "He turned
14 away from a residential area." Was he close to the
15 ground when he did that?

16 LT. COLONEL HORSTMAN: Based on my
17 knowledge of the accident, the accident report, and
18 his verbal testimony, or verbal telephone
19 conversation, yes. Progressively closer and closer to
20 the ground as he began making maneuvers, so he got --
21 as he stated, below 100 feet he was still trying to
22 avoid things, to include an aircraft in the taxiway.

23 MR. SOPER: So that he could land the
24 aircraft.

25 LT. COLONEL HORSTMAN: Yes, so that he

1 could land the aircraft.

2 MR. SOPER: Entry number 10, your summary
3 indicates the engine failed and the aircraft was on
4 fire. Is that correct?

5 LT. COLONEL HORSTMAN: That's correct.
6 And again, the pilot pointed towards an emergency
7 airfield, as opposed to avoiding it. And then a
8 formation member offered some advice, and I find that
9 interesting because in a number of cases, we're now
10 not going to rely on the pilot's actions, but a
11 wingman, or a flight lead, or a radar controller, or
12 some other third party to ensure avoidance of
13 something on the ground. That is an incredibly
14 difficult thing to do, and let me give you a brief
15 example.

16 We'll use the PFS site because we're all
17 familiar with that area. You're wingman and your
18 flight leader is two miles to the left or right of
19 you. How are you going to be able to direct him 10
20 degrees away, which is they say is all is needed, away
21 from the flight when it's already 20 to 30 degrees to
22 the left of your nose? How do you represent his point
23 in space, his heading horizontally, vertically with
24 where exactly he's heading? You're going to have to
25 ask, do you see the PFS site? Yes, I do. Okay. Then

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1 avoid it. So now we have to have a conversation to
2 allow a wingman or a leader, or a radar agency to help
3 an avoidance maneuver when if, it's a very, very busy
4 time, it's very, very distracting. And typically, the
5 pilots are focused on ejecting, and they still get
6 that wrong half the time. So now we're going to ask
7 a third party to help him out.

8 MR. SOPER: I notice that this ejection
9 occurred above 10,000 feet?

10 LT. COLONEL HORSTMAN: Yes, sir. The F-16
11 manual says that if you're on fire, you eject. I
12 think the term is, "If fire is confirmed, eject." So
13 he's way above the ground. His parachute ride down
14 was quite lengthy, probably cold also. If you're on
15 fire, you don't land. You get out of the airplane.

16 MR. SOPER: I see the facts indicate that,
17 "The aircraft, or that the pilot turned west away from
18 populated area on advice of a crew member formation."

19 LT. COLONEL HORSTMAN: That's correct.

20 MR. SOPER: Would turning away from a
21 populated area or it says, "The aircraft impacted in
22 sparsely populated area". Is that sufficient accuracy
23 to avoid a particular site like that PFS site?

24 LT. COLONEL HORSTMAN: Well, in this case,
25 you know, he's near St. Louis, just like being near

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1 Salt Lake City, so I'm firmly convinced that we would
2 all be able to avoid a huge city, because everyone
3 knows it's there. And it's -- you know, you would
4 make an attempt to avoid that. An attempt to avoid an
5 individual site of a few acres on the ground,
6 absolutely not.

7 MR. SOPER: This aircraft impacted a
8 sparsely populated area. I guess you would -- would
9 you consider Skull Valley to be sparsely populated?

10 LT. COLONEL HORSTMAN: I would.

11 MR. SOPER: The entry number 11, is there
12 any indication there that the pilot saw any ground
13 site, or took any action to steer away from it?

14 LT. COLONEL HORSTMAN: No, and he clearly
15 had time. He tried to restart the engine six times.
16 He directed the aircraft towards a ridge line. We
17 have no reference to whether or not there is any site
18 he's trying to avoid, or if there's a place where he's
19 trying to eject so that his landing is going to be
20 more comfortable. We have no indication that he's
21 avoiding anything, and after six air-start attempts,
22 he still ejected below the minimums.

23 MR. SOPER: Number 12, shows the engine
24 failed during a training exercise, and then the facts
25 indicate that the pilot, "Cleared his flight path as

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1 to other formation members, then spent over five
2 minutes on three attempted air-starts before
3 ejecting." Now when it says, "Cleared his flight
4 path", what does that mean?

5 LT. COLONEL HORSTMAN: Well, on Exhibit
6 100A, it appears to indicate that he cleared his
7 flight path with respect to some object on the ground.
8 In fact, it was near an ACM, an Air Combat Maneuvers
9 Engagement, and his responsibility to his formation
10 members at that time, as stated in the tactics manual,
11 are to clear your flight paths so you don't run into
12 one of the other airplanes you're flying with. So in
13 this example, he cleared his flight path so that he
14 didn't hit his wingman, or his leader, or the bandit,
15 or anybody else.

16 It makes no reference in here to avoiding
17 any site on the ground. It makes a reference to
18 trying to maintain his formation discipline.

19 MR. SOPER: After clearing his flight path
20 as to other formation members, then the pilot spent
21 over five minutes attempting to restart. Right?

22 LT. COLONEL HORSTMAN: That's correct.

23 MR. SOPER: So it wouldn't make any sense,
24 in any event, that clearing your path meant with
25 reference to something on the ground when you're not

1 ejecting for five minutes.

2 LT. COLONEL HORSTMAN: No, you're -- I'm
3 guessing here. You're 20 miles away from where you're
4 going to impact, so why would that matter? I mean,
5 it's not part of what you would do in that phase of
6 flight. You lose an engine, you start solving it.
7 We're nowhere near the thinking about ejecting, or
8 thinking about emergency airfields, not running into
9 formation members. It's incoherent as to why that
10 would be used.

11 MR. SOPER: Entry number 13 shows that the
12 pilot had a failed engine and turned towards an
13 emergency airfield, and attempted restarts. And then
14 it says, "The pilot delayed ejection below minimum
15 ejection altitude to get below clouds. Pilot then
16 cleared flight path away from inhabited farm", so here
17 there is a reference to a particular ground site.
18 Does it say anything that what the pilot did -- what
19 does, "clear his path" mean?

20 LT. COLONEL HORSTMAN: I'm assuming in
21 this case it means that if he's clearing his flight
22 path away from the inhabited farms, then he's
23 attempting to avoid those.

24 MR. SOPER: So this particular one shows
25 that the pilot did attempt to avoid a particular

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1 object?

2 LT. COLONEL HORSTMAN: Yes, sir, and yet,
3 if you read further, he was unable to do that above
4 2,000 feet. He had to descend below the weather down
5 to 1,600 feet in order to accomplish that task,
6 violating the regulation.

7 MR. SOPER: Reference to No. 14, "Engine
8 failed at 21,000 feet MSL." In the body it says, the
9 pilot "turned towards what he perceived to be a less
10 congested area." Was the pilot successful in avoiding
11 anything in that case?

12 LT. COLONEL HORSTMAN: No, he destroyed
13 two homes, killed a child, injured a mother. You need
14 to back up on this one and find out what really
15 happened, and when you read the body of the report,
16 this pilot loses an engine and thinks he can make an
17 emergency airfield. He subsequently realizes that he
18 cannot make the emergency airfield because it doesn't
19 have enough energy. The aircraft won't glide that
20 far. But he does get a little restart. So he
21 continues to press to try to make the emergency
22 airfield, knowing that if the engine quits, he does
23 not have the energy. He kept doing that, kept getting
24 partial relights. It went out one last time, and now
25 he doesn't have the opportunity to bail out over the

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1 Gulf of Mexico because he's task-saturated trying to
2 land the airplane. This is an egregious pilot error
3 that he should have never attempted to land.

4 I mean, he ejects at 209 feet above the
5 ground, trying to point towards what he perceives to
6 be a less congested area. So what's less congested in
7 a residential neighborhood? Why was he there?

8 CHAIRMAN FARRAR: Mr. Soper, while we're
9 on that one, let's talk about this one. We said a
10 long time ago it's a bad thing if I check out an
11 airplane in the morning and don't bring it back in the
12 afternoon. That was my language, not yours.

13 LT. COLONEL HORSTMAN: That's fine. I
14 would agree with that, sir.

15 CHAIRMAN FARRAR: He's getting restarts,
16 and even though in his training he's told we have a
17 lot of airplanes and we only have one of you, he
18 thinks he can make it.

19 LT. COLONEL HORSTMAN: Well, actually, no,
20 Your Honor, that's not true. He knows he cannot make
21 it. He hopes he can fix it and make it, and there's
22 a big difference.

23 CHAIRMAN FARRAR: Okay.

24 LT. COLONEL HORSTMAN: He knows enough
25 information that if the engine doesn't successfully

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1 restart and operate normally through landing, he will
2 not make the airfield.

3 CHAIRMAN FARRAR: Okay.

4 MR. SOPER: Is that satisfactory, Your
5 Honor?

6 CHAIRMAN FARRAR: It's satisfactory to me.
7 I'm sure a number of these will not be satisfactory to
8 your opponents.

9 MR. SOPER: I can't recall if we covered
10 No. 15 or not.

11 LT. COLONEL HORSTMAN: We have not.

12 CHAIRMAN FARRAR: No, I interrupted you on
13 14 just before you were ready to start 15.

14 MR. SOPER: Oh, I see, thank you.

15 Calling your attention to No. 15, I see
16 that here's a case where the pilot ejected at 2,000
17 feet and repointed his aircraft "towards unpopulated
18 terrain." Any indication in the report that the pilot
19 either saw or attempted to avoid any ground site?

20 LT. COLONEL HORSTMAN: No, and it's an
21 easy phrase to say when you're in the middle of
22 nowhere. Twenty-five miles west of Deming, New
23 Mexico, is kind of like the west desert. There's not
24 a whole lot. So it's an easy thing to say that you're
25 towards unpopulated terrain, especially if you know

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1 that there's really not a lot of populated area out
2 there.

3 So was he successful? Well, I don't think
4 he could be unsuccessful. So, again, it's an easy
5 phrase to say. We can't measure, there's no measure
6 of merit in here as to whether or not he avoided
7 anything.

8 And the last part of that one, he does
9 eject at 2,000 feet, so he's doing all the right
10 things, but he hits a ranch. Do we know how big is
11 the ranch? Did he come close to the house? We have
12 no indications. If he's trying to go towards
13 unpopulated terrain, is there a farmhouse and a barn
14 on this ranch? You know, we don't know.

15 MR. SOPER: Again, the PFS site would be
16 on what you would characterize as unpopulated terrain?

17 LT. COLONEL HORSTMAN: Yes, sir.

18 MR. SOPER: No. 16, it appears that the
19 facts are that the pilot turned out towards the ocean.
20 So there's some indication of the pilot directing the
21 aircraft anyway. Any suggestion that the pilot was
22 trying to avoid a particular site?

23 LT. COLONEL HORSTMAN: No, just that he
24 was trying to make the ocean.

25 MR. SOPER: And I notice that he ejected

1 below the minimum of 2,000 feet?

2 LT. COLONEL HORSTMAN: He ejected at 1,100
3 feet above the ground.

4 MR. SOPER: Can you describe the incident
5 in No. 17 for us, briefly?

6 LT. COLONEL HORSTMAN: Yes, this is an
7 interesting accident report because it contains a lot
8 of radio transcripts. Exhibit 100A would lead you to
9 believe that the aircraft turned towards a control
10 bailout area, then flew towards the airfield to land,
11 and the aircraft is flying for 14 minutes after it
12 catches fire.

13 Well, in fact, the aircraft never did
14 point towards the control bailout area. There's no
15 indication in the transcripts of that whatsoever.
16 They discussed it, and then he failed to do that. He
17 tried to land instead. And then there's smoke in the
18 cockpit, and the pilot ejects. He ejects at a
19 thousand feet.

20 So here's a case where he's got outside
21 help from a radio agency, the supervisor of flying,
22 and flight members as to where to go to jump out, and
23 he ignores them and tries to land the airplane, and it
24 fails. He jumps out at approximately a thousand feet.
25 We have no indication that he attempted to maneuver

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1 away from any ground site.

2 MR. SOPER: Thank you. I take it from
3 your brief description of No. 18 that there's just no
4 indication of any --

5 LT. COLONEL HORSTMAN: No, but Exhibit
6 100A would lead you to believe that he rolls out of a
7 turn, which he's maneuvering the aircraft. If you're
8 going to eject, your chances of success are much
9 greater if your wings are level as opposed to in a
10 bank because of the lift vector. So that's a survival
11 maneuver. That has nothing to do with avoiding
12 anything. And he jumps out at a thousand feet, again,
13 above the ground.

14 MR. SOPER: No. 19, I know looking at PFS
15 Exhibit 100, it indicates that the pilot -- or it just
16 says, "Turns toward base."

17 LT. COLONEL HORSTMAN: That's correct.

18 MR. SOPER: Any indication that that's
19 what the pilot did actually in No. 19?

20 LT. COLONEL HORSTMAN: No. The wingmen,
21 in fact, in this case directed the pilot to the
22 landing base, but there's no indications in the
23 accident report that a turn was ever made. The
24 hydraulics fail, smoke and fumes in the cockpit. So
25 the pilot can't see out of the aircraft, and the

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1 aircraft is not controllable, does not respond to
2 pilot inputs. He ejected out of a spin at 23,000
3 feet. This is another case where we have an engine
4 failure that PFS says this pilot is able to avoid the
5 PFS site. That's ridiculous.

6 MR. SOPER: And the pilot, you say, bailed
7 out at 23,000 feet in this case?

8 LT. COLONEL HORSTMAN: Yes, sir.

9 MR. SOPER: And he ejected while the plane
10 was in a spin and uncontrollable, is that right?

11 LT. COLONEL HORSTMAN: That is correct.
12 Again, this is an "able to avoid the PFS site" in the
13 categories from PFS.

14 MR. SOPER: Now I notice that the Entry
15 No. 19 on PFS site has no reference to the aircraft
16 being out of control, is that right?

17 LT. COLONEL HORSTMAN: No, it just
18 indicates that he flew towards the landing base and
19 flew for a few minutes. They've omitted that part.

20 MR. SOPER: Okay, now going to No. 20.

21 LT. COLONEL HORSTMAN: In this case while
22 returning to the base, the electrical system shut
23 down, the jet began uncommanded barrel rolls. The
24 pilot ejected while out of control.

25 MR. SOPER: What is "uncommanded barrel

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1 rolls"?

2 LT. COLONEL HORSTMAN: The aircraft is
3 doing a barrel roll, and the pilot is trying to stop
4 it from doing that.

5 MR. SOPER: What is a barrel roll?

6 LT. COLONEL HORSTMAN: Let me first
7 explain an aileron roll. An aileron roll is to roll
8 about the longitudinal axis of the airplane, just like
9 that. A barrel roll is the same thing except you're
10 rolling around a cylinder. So you would roll like
11 this. It would be, instead of a flight control input,
12 instead of just left or right stick, you would put
13 left stick or right stick, and you would load up the
14 aircraft so that the aircraft would rotate around that
15 axis of the cylinder.

16 MR. SOPER: So in this there's not
17 something the pilot was attempting to do? It's
18 something that --

19 LT. COLONEL HORSTMAN: Oh, no, he was
20 trying to stop it from doing that and he couldn't, and
21 the aircraft was doing its own thing. Again, it's
22 uncontrollable.

23 CHAIRMAN FARRAR: Mr. Soper, just so the
24 record is clear about the hand motions, could we
25 fairly describe what you did as the aileron roll, is

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1 kind of one-dimensional. The longitudinal axis keeps
2 going, and you're just rotating around that. Whereas,
3 the barrel roll is two- or three-dimensional. You're
4 making a circle without keeping the -- the
5 longitudinal axis is not staying straight. It's
6 describing a circle in the air?

7 LT. COLONEL HORSTMAN: Yes, sir, that's
8 fine.

9 CHAIRMAN FARRAR: Okay.

10 MR. SOPER: Thank you, Your Honor.

11 And the pilot ejected before he could
12 bring the aircraft back under control?

13 LT. COLONEL HORSTMAN: Yes.

14 MR. SOPER: Now Entry No. 20 on PFS
15 Exhibit 100 or 100A makes no mention that the aircraft
16 was out of control, is that correct?

17 LT. COLONEL HORSTMAN: That's correct.

18 MR. SOPER: No. 21, I see that the
19 aircraft struck a bird and caused engine failure and
20 fire, is that right?

21 LT. COLONEL HORSTMAN: That's correct.

22 MR. SOPER: Any indication that the pilot
23 took any action to steer away from a ground site?

24 LT. COLONEL HORSTMAN: No, but there's
25 definite indications in the accident report that he

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1 intended to go to his emergency airfield and land the
2 airplane. So there's no indications he's avoiding a
3 ground site, but there's a specific indication that
4 he's trying to land the aircraft, and he ejects at
5 2,800 feet, in accordance with the regulations.

6 MR. SOPER: No. 22, I first refer you to
7 the PFS Exhibit 100 or 100A. There seems to be a lot
8 of turning and actions by the pilot there that are
9 claimed to be apparently indicative of being able to
10 avoid a site. Could you tell us what PFS 100A says in
11 that regard?

12 LT. COLONEL HORSTMAN: Their document
13 says, "Turn towards Taegu Air Base after initial
14 engine problems, then towards Pohang Air Base after
15 determining weather not good and considering terrain
16 at Taegu. Turn towards more favorable bailout
17 condition after engine failed."

18 MR. SOPER: Any of those things suggest
19 that the pilot would be able to avoid a ground site?

20 LT. COLONEL HORSTMAN: No, they suggest
21 that he doesn't a fine job; he tries to get to an
22 emergency field, and then decides that the best place
23 to land is in the water. So there's no indications
24 he's avoiding anything. He's turning towards more
25 favorable bailout conditions. It said, "Beautyrest

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1 syndrome" again.

2 MR. SOPER: Can you briefly tell us about
3 No. 23?

4 LT. COLONEL HORSTMAN: Twenty-three, he's
5 in the Carolinas and has an engine failure, attempted
6 an air start and he ejects. What I find interesting
7 is that he aims for the ground instead of the water
8 for the land. He ejects between 900 and 1,000 feet.
9 There's not only no indication that he's trying to
10 avoid something. You could read into this potentially
11 that he might be trying to hit something. Now I
12 wouldn't do that because I don't believe any pilot
13 would ever hit anything on purpose, but the
14 indications from the aircraft on the previous accident
15 report just going over the water is probably better
16 and there's less risk of damage. So he's aiming it
17 for the land.

18 MR. SOPER: What about No. 24?

19 LT. COLONEL HORSTMAN: Another engine
20 failure. Pilot turned towards the airfield, once
21 again, trying to land the aircraft. Crashed short of
22 the runway on the landing attempt. Failed to eject.
23 Received burn injuries, fractured spine. No
24 indication that the pilot checked/steered away from
25 ground sites.

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