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Leading Complex Organizations: Lessons from a Tragic Organizational Failure
Scott A. Snook

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Leading Complex Organizations:
Lessons from a Tragic Organizational Failure

Scott A. Snook

April 27, 2000

Lieutenant Colonel Scott A. Snook, U.S. Army(USA), is an academy professor and director of the Center for Leadership and Organizations Research [CLOR], Department of Behavioral Sciences and Leadership, U.S. Military Academy (USMA), West Point, New York. He develops and teaches undergraduate courses in organizational change and leadership, and administers and teaches in a master's level program in leader development for future tactical officers at West Point. As director of CLOR, he manages the department's programmatic research and consulting efforts in leadership and organizations. His military assignments included serving as special assistant to the commanding general, Army Materiel Command; secretary of the General Staff, I Corps; assistant professor in the USMA Department of Behavioral Sciences and Leadership; and positions of increasing responsibility in Company B, 307th Engineer Battalion, 82nd Airborne Division, culminating in his assignment as company commander. He has received the Bronze Star, the Army Achievement Medal (three awards); the Purple Heart; the National Defense Service Medal; the Meritorious Service Medal (four awards); Armed Forces Expeditionary (Grenada); the Army Commendation Medal (four awards); and the Master Parachutist award. His book Friendly Fire: The Accidental Shootdown of Black Hawks in Northern Iraq *was published by Princeton University Press in 2000. Lieutenant Colonel Snook holds a B.S. degree from USMA, where he was named most outstanding overall cadet in his graduating class, an M.B.A. from Harvard Business School, and a Ph.D. from Harvard University. He has also attended the Command and General Staff College, Combined Arms Service Staff School, Engineer Officer Advanced Course, Electronic Warfare Officers Course, Jungle Warfare School, Arctic Warfare School, Jumpmaster School, Engineer Officer Basic Course, and Airborne School.*

Oettinger: More than any previous visitor, our speaker today needs no introduction. You've seen his biography, and you've all read his book. As for me, he's an old friend. So, without further ado, Scott Snook, it's yours.

Snook: Thanks. Since you've all seen the book, I thought we'd do something a little different in terms of format, and actually use some video clips and overheads to try to walk through the case as it unfolded. Instead of my talking for a while and then asking for questions at the end, please stop me as we go through and I'll sort of prompt you along the way. I hope that the video clips and the overheads will help you to recall pieces of the case study and generate some questions

you recall from the book, if you read it quickly. I'll also take a slightly different angle on the story itself. I'll go through this fairly quickly, but you'll get a chance to ask questions about each part of the case. We'll look at it as a sort of mystery novel: the kind you curl up with on a rainy spring day.

To refresh your memory, at approximately 10:30 hours in the morning, local time, on April 14, 1994, in clear skies over the mountains in northern Iraq, two U.S. Air Force [USAF] F-15 Eagle fighters shot down two U.S. Army UH-60 Black Hawk helicopters, killing all twenty-six peacekeepers on board. This was my country's worst case of friendly fire since World War II.

How in the world could this happen? We couldn't blame the typical culprits: the chaos of the battlefield, the smoke, the good guys getting mixed up with the bad guys in the confusion. This happened in broad daylight, a full three years after the end of the Gulf War. Visibility was unlimited. There weren't any bad guys on the ground, and there was no shooting war going on, so we couldn't blame it on our favorite excuse, the fog of war. Both shooter and target aircraft were operating under the positive control of arguably the most sophisticated Airborne Warning and Control System [AWACS] aircraft in the world (**Figure 1**). Pilots in both the F-15s and the Black Hawks were in radio communication with air traffic controllers in the back of the AWACS only minutes prior to the shootdown.

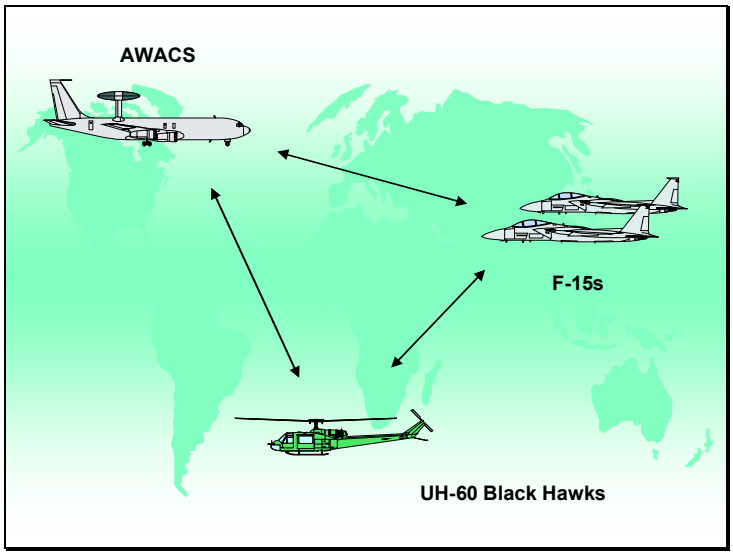

Figure 1

There was no real emergency here. If you picked it up from the book, only eight minutes elapsed from the time they made their initial contact until the time the F-15s shot the helicopters down. Yet, in that terrain in northern Iraq, and given there were two helicopters and two supersonic jet fighters, there was really no sense of urgency. They weren't much of a threat. Even if they had been Hind helicopters, as the pilots thought, and the fighters had been unarmed, if an F-15 pilot gets shot by a Hind helicopter, he probably wants to go crash in the desert, because he would be so embarrassed to go back and face his buddies.

Both shooter and target aircraft were equipped with sophisticated IFF [identification friend or foe] electronic equipment designed specifically to prevent this kind of accident from ever

occurring. All three aircraft involved belonged to the same well-established combined joint task force, an organization that operated successfully without incident for over three years. Given the long history of organizational success, the relatively benign conditions at the time, and some of the best trained people and best equipment in the world, how in the world could this happen?

Literally overnight, teams of experts from around the world converged on Incirlik Air Base, in Turkey, to determine the cause of the accident. After ten months and tens of thousands of man-hours of investigation, then Secretary of Defense Dr. William Perry concluded—and these points are taken right out of an internal Department of Defense memorandum—that the accident was caused by the following four failures: the F-15 pilots misidentified the Black Hawks; the AWACS crew failed to intervene; the Army helicopters were not very well integrated into this overall Air Force-heavy task force; and, finally, something went terribly wrong with the IFF system.

If my fourteen-year-old son Sean were in the room, it would be at this point he'd raise his hand, and if I were silly enough or stupid enough to call on him, he'd look at this and in an American sort of teen-age vernacular he'd say something like, "No, duh! Come on, ten months, tens of thousands of man-hours of investigation, and this was the conclusion!" This is where they ended. This is their explanation.

You're all bright, and you've thought about these things for a while. I thought that maybe this afternoon what we'd do is try to pick up where they left off in their investigation and actually turn each of the answers on its head into a question. So I'm going to deputize you all as Air Force investigators this afternoon, and try to make sense of this thing. I'm going to ask you to do two things. The obvious question is: How in the world could this thing happen? There are four subquestions under that: (1) Why did the F-15 pilots misidentify? (2) Why did that nineteen-member AWACS group sit there and watch this whole thing go down and not do anything? (3) Why did it seem as though the Army helicopters weren't very well integrated or a part of the overall organization? (4) What went wrong with the IFF system? As investigators, you've got to figure out why it happened.

The other question is a little different. A lot of people are involved in this. I'm going to ask you at the end, in an hour or so, whom you would hold responsible or accountable.

So, sit back, fasten your seatbelts, and join Sam Donaldson and me this afternoon as we lead you through the friendly fire shootdown in northern Iraq.[1]

> **Sam Donaldson:** The story begins, really, shortly after the Gulf War ended, in March of 1991. In order to protect the Kurdish people in northern Iraq from dictator Saddam Hussein, the United States established a no-fly zone above the 36th parallel. Saddam was told, "Don't fly here or we'll shoot you down," and every day, U.S. jets have prowled the skies since, watching for violations, which brings us to our moment of crisis, April 14th, 1994.

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[1]H. Phillips (producer), *Avoidable Errors* (New York: ABC News—PrimeTime Live, March 8, 1995). This program, cohosted by Sam Donaldson, contains interviews and news clips about the shootdown, including comments by members of the families of the victims who are identified from the transcript. All excerpts from this ABC News–PrimeTime Live program quoted throughout this presentation are drawn from this source.

President Clinton: On behalf of the American people I want to begin by expressing my deep sorrow at the tragedy this morning in Iraq.

Allen Hall (father of CW02 Michael Hall)[2]**:** Two helicopters shot down in northern Iraq, and I just felt a tenseness in the back of my neck.

Joan Piper (mother of Lieutenant Laura Piper)**:** I had this terrible sense of panic. I cried and I begged God not to make it so.

Kay Mounsey (wife of W01 Erik Mounsey)**:** I thought, well, it must not be Erik, because if it was, I would know by now.

Eileen Thompson (wife of Colonel Jerald Thompson)**:** My daughter called and said, "There are no survivors." And out of the corner of my eye I saw the navy blue staff car, and it was the angel of death coming down the street.

Kay Mounsey: And it took him a long time to work up to say it was friendly fire. It was believed to be friendly fire.

Sam Donaldson: On the morning of April 14th, 1994, two U.S. Air Force F-15s flew into northern Iraq. Their orders: to shoot down any Iraqi aircraft they encountered. They found two helicopters that they thought looked like Russian-made Hinds, bristling with weapons, and when they went in for the kill, they got no wave-off from the sophisticated U.S. surveillance plane spotting from aloft.

Unidentified Pilot: Splash one Hind.

Sam Donaldson: It was over in 90 seconds. The helicopters crashed into the mountain hillside, killing everyone.

Video Voice: No survivors.

Sam Donaldson: But the twenty-six men and women aboard were not Iraqis.

Video Voice: Confirmed they were Hinds.

Sam Donaldson: The helicopters were not Hinds after all. They were U.S. Army Black Hawks.

Unidentified Woman: How can you tell these mothers and fathers and wives and children that they know who killed their relatives, but yet nobody is accountable?

Sam Donaldson: Recently the families of some of the victims got together for the first time with us to talk about their loss, about how it happened so quickly.

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[2]Family members are identified in relation to victims of the shootdown.

Eileen Thompson: There were so many things they could have done. I don't think they had to fire.

Sam Donaldson: About the collection of the mistakes that came together.

Connie Bass (mother of SPC Anthony Bass)**:** How come one individual couldn't say, "Hey, fellows, something's going on wrong here!"

General John Shalikashvili: There were a shocking number of instances where individuals failed to do their jobs properly.

Sam Donaldson: "Many failures by many people," said the chairman of the Joint Chiefs. But after ten months of investigation, the military has decided that only one man made a mistake worth convening a court martial, no one else. That one man is Air Force Captain Jim Wang.

The Air Force says that you failed to coordinate between your two controllers, and that you failed to warn the F-15s that the Black Hawks were in that area.

Captain Wang: I still feel that I did everything that we were equipped and informed to do.

Sam Donaldson: Captain Jim Wang, born in Taiwan, brought to the United States by his parents when he was two years old, a graduate of the United States Air Force Academy, was trained to direct controllers aboard an AWACS surveillance plane. He's been charged with three counts of dereliction of duty.

In your heart, you don't believe you were responsible for those deaths?

Captain Wang: No.

Snook: If not Captain Wang, then who? You've met a lot of other people if you read the book. But just to review, where were the rest of the leaders? This is what the organization looked like on the day of the shootdown (**Figure 2**). It was a combined joint task force. It had units from different countries. It's joint in the sense that it has different services involved. The blue is the Air Force and the green is what's left of the Army at this point. This is the way the organization was designed to operate. Is that the way you'd design it?

Student: That's a different issue.

Student: In the military coordination center, the MCC, were there mainly Army personnel?

Snook: Yes, that was Army. It was run by a Special Forces colonel. It was located about 300 meters across the border in northern Iraq. You'll see it in a later video clip. It's nothing more than a little shack with a helipad next to it. It was the jumping-off point for any NATO or relief agency mission going into northern Iraq. They'd land at the helipad, coordinate operations, and then go out to villages in northern Iraq.

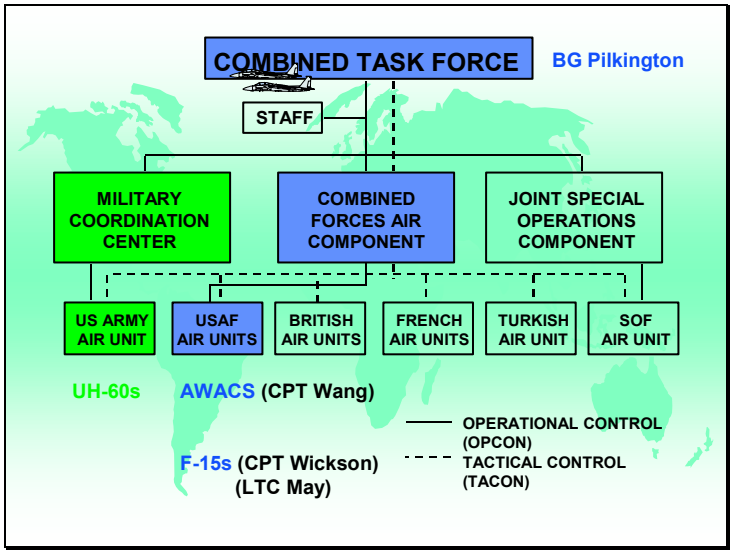

Figure 2

Student: Were they staffed with Army air operations?

Snook: Right. They were Army air operations out there.

Student: I'm not talking about the Eagle flight guys, I'm talking about the staff officers in there and the air operations officer who coordinated Eagle flight stuff with the larger task force.

Snook: Actually, Eagle flight gave them a liaison officer who was sitting in their headquarters.

Student: I remember reading a piece in the news some years ago that the F-15 pilots did take a close look at the two helicopters, which looked very much like the Soviet Hinds. So, how great is the distance?

Snook: You will actually be able to see that. They were 500 feet above and about 1,000 feet over. We'll go through a little drill later that will give you some idea of how difficult or easy it was to make that call, and you'll see in the video clip pictures of the two aircraft side by side.

I just want you to recall that this is what the organization looked like. This is the way it was designed to work. It's a typical sort of hierarchy with a command structure.

Student: This isn't an unusual structure. This is normal.

Snook: This is a typical joint task force. From an organizational theory perspective, when do you use a task force?

Student: When you have a special mission.

Snook: For a special mission. You grab capabilities from different units and different people, and you throw them together under one sort of joint command. The key thing that came out of this case was that typically you put a task force together for a certain job, and then you do the job and it disbands. It's not meant to be a permanent organization. At the CINC [commander in chief] conference after the shootdown, one of the ten lessons learned from this case for all the CINCs in the room was: "Go back to your CINCdoms and look at all the task forces that you've got out

there that have been there for years. They were originally designed for a short period of time and seem to have taken on this permanent character." Of course, this is still in operation today.

Student: I just heard you say something different from what I thought you were going to say. That is, you didn't say they should go back and do away with the task force, but just look at restructuring it. A lot of times you can set up a joint task force for quick response, but that doesn't mean that the task force should go away. In fact, as long as you remain with the combined organization, you have to have…

Snook: …some force structure…

Student: …a combined task force still.

Student: In fact, there are things called standing joint task forces, which have funding lines that continue.

Snook: We still have a multinational peacekeeping force in Israel that has been going since the early 1970s.

Student: So, in this particular case it wouldn't be unusual today for this task force to be in place.

Snook: Right, but, again, the point to the CINCs was that you design a task force for a certain purpose. This one was designed three years before the shootdown, for a certain set of conditions. The world changes in three years, and the organization changes, but they were actually still operating under the same op plan—the original plan with amendment after amendment after amendment. It's kind of like building your house. You add on a piece here and a piece here and a piece here, and it becomes sort of unwieldy and inefficient over the years.

What they were saying at the CINC conference was, "Go back and re-look at your organizational structures that were designed for a certain mission and evolved over the years but are still in place. Maybe there's a better way to do it. And re-look at your op plans that are still in there."

Student: Since you're on the subject of drift, it seems that your rate of drift would probably have to do with a lot of things, but one is how fast you're turning over your personnel. If I remember right, in this particular joint task force you were turning over your personnel very rapidly.

Snook: In fact, every thirty days a new AWACS crew would come in from Tinker Air Force Base. About every six to eight weeks a new helicopter unit would come down out of Germany to do Eagle flight. It was about the same for the F-15 squadrons and F-16 squadrons. Staff rotation was even shorter.

Student: Did they also tell the CINCs not to do that?

Snook: They didn't tell the CINCs anything. At least according to the report I read from the CINC conference, they said, "Go re-look at this thing, learn some lessons from it, and look at your manning, your structure, and how they're rotating."

The initial reaction was that actually a rotation like this should defeat drift, because every time a new unit comes in we give them all the rules, like the SOP [standard operating procedure], and they read them. Everybody had to read the Air SOP. So they should start going by the rules they just read.

Student: When you relieve the watch, the first thing you do is ask, "What's going on, and how did you do it?"

Student: Until you've rotated through a couple of times.

Snook: Every fourth or fifth time there. About two-thirds of the AWACS crew had already done this mission. In fact, exactly what happened was that there was a brand-new second lieutenant, the en-route controller, who talked to the helicopters right in the beginning. He was ready to key his mike, because the helicopters flew into northern Iraq and crossed the border. There's actually an AWACS crew permanently stationed there, and they shadow the new crews whenever they come in. So, since it was their maiden voyage in country, the local expert tapped him on the shoulder and asked, "What are you getting ready to do?" He said, "I'm getting ready to tell the helicopters to switch over to the no-fly-zone frequency and the no-fly-zone controller." Of course, the local expert said, "Oh no, that's not how we do it around here. The helicopters just talk to you."

This was a great example. The book clearly says, "If you're in the no-fly-zone airspace, you talk to the no-fly-zone controller over the no-fly-zone frequency." At the time of the shootdown, the helicopters were talking to the en-route controller, and the F-15s were talking to the no-fly-zone controller. They were in the same airspace, talking to different controllers on different frequencies. The new guy was ready to go by the book, but the local expert said, "No, that's not how we do it. The helicopters talk to you." What are you going to listen to? Are you going to listen to a three-year-old book of rules, or to the local expert who has been doing it for years? So in one sense, the turnover would defeat drift because you get fresh troops coming in, and they go back to the rules. In another sense, you've got this local expertise being passed on, which means that when you relieve somebody they tell you how they really do it, and that's what happened.

Student: Getting back to the wiring diagram for the task force (Fig. 2), that's the reason I asked about the liaison officers. The way we defeat coordination problems in a task force like that is the liaison officers collocate in headquarters. There's a whole list of things to do.

Snook: The aviation liaison officer to the Combined Forces Air Component [CFAC], the Army guy, was marginalized in the Air Force.

Student: It depends on who the liaison officer is. So when they went back to the CINCs, they should have asked them to check out the liaison officers. Do they have a list of what they're supposed to do?

Snook: Are they credible?

Student: Or is the liaison officer whom you put over there always the guy who was broke?

Snook: A lot of times that's whom you sent.

Student: Did the foreign air units ever patrol the no-fly zone?

Snook: Yes. They were patrolling all the time.

Student: Did they coordinate with U.S. AWACS aircraft?

Snook: Yes, all the time. That's what the tactical control line is (Fig. 2). When they're flying over northern Iraq, all aircraft are being commanded and controlled through the CFAC, actually through the AWACS.

You could say, "Wow!" You might expect the organization to fall apart here—different countries, different equipment, different doctrines, different rules, different languages—when, in fact, it fell apart within the host country. We know we're working with different countries and we're aware that there might be coordination issues, so we spend a lot of time trying to make sure that we're on the same sheet of music between countries, and yet this happened between services within the same country.

Student: Perhaps there are more cultural differences between the Army and the Air Force than between the U.S. Air Force and the other countries' air forces.

Oettinger: Helicopters aren't aircraft!

Snook: That's right. That's what the clerk who put together the flow sheet said.

I just came back from South Africa and I visited all three of their services, and, clearly, the navy in South Africa is much like the navy in the United States, the army in South Africa has the same culture as the army in the United States, and the air force in South Africa is much like ours. Air forces around the world, navies around the world, armies around the world have very much the same cultures, more so than the different services within the same country, and it's fascinating, Around the world all the services have very similar traditions, and the same sorts of cultures. Fighter pilots around the world seem to come from the same mold. Grunts, infantry guys, seem to be the same kinds of people, and seem to think alike.

Student: They watch the same movies.

Snook: This is what we see. We all see the same movies, and we train each other, don't we?

Student: Just to clarify, in northern Iraq, it just so happened in this particular case that we had a U.S. AWACS up there. There are other AWACS crews, other nationality AWACS that can fly, and they sometimes come in and control. There's the NATO AWACS, for example.

Snook: Especially if it's a NATO mission, they'll rotate other NATO units through, so it's certainly possible.

The reason that I put this up there was that in the military we've got a saying that leaders are responsible for everything their units do or fail to do (**Figure 3**). It's a mantra in the military. So if you want to find whom you're going to hold accountable for this, look to the leaders. Of course, that's not the whole story. I have part of this covered up. I just want to throw this short clip in to remind you of something important: that it's not quite that simple. I think this will make my point.

> **Video Voice:** Hey, man, listen, I was wondering if you might help me, huh? Listen, I'm in the bumper sticker business and I've been trying to think up a good slogan. Since you've been such a big inspiration to the people around here, I thought you might be able to help me jump into…. Whoa, man, you just ran through a big pile of dog shit!

Video Voice: It happens.

Video Voice: What? Shit?

Video Voice: Sometimes.

Forrest Gump: Some years later I heard that fella did come up with a bumper sticker slogan and he made a lot of money off of it.

Figure 3

Snook: On the one hand, as leaders we are responsible for everything that goes on in our organizations. But on the other hand, with a little bit of experience in the real world, you know that stuff happens out there.

As you watch the rest of the case unfold and you watch the video clips and you remember your reading, what you've got to try to do is disentangle in your own mind (see if you can do this) the things that you would hold somebody accountable for—something that should be foreseeable, where somebody should have done something about it—from what Forrest Gump was talking about: stuff just happens. There's that random error of nature.

So as you watch the next video clip, as we start getting into the shootdown itself, you're going to start to see things go wrong. As you see something go wrong, make a note of it and then try to decide if that is something you'd hold a leader accountable for—something that somebody should have been able to foresee and do something about—or if it is just that stuff happens.

Sam Donaldson: 7:36 AM, Captain Wang is onboard an AWACS plane as it takes off from Incirlik Air Force Base in Turkey, headed east for a routine surveillance mission over the Iraqi no-fly zone. The Airborne Warning and Control System, AWACS for short, with its large radar dome on top of the fuselage, functions like a kind of air traffic control tower in the sky, with positions for more than a dozen crew and controllers with

radar screens that can display traffic as far away as 300 miles. The controller supervisor was Captain Wang.

Captain Wang: We are the people who are talking to the fighters, talking to the aircraft that come up on our frequency. Basically, I work for the mission crew commander.

Sam Donaldson: Major Larry Tracey was that morning's mission crew commander, and he had a problem.

Major Tracey: We found out that this console was out and that we would have to put the en-route controller someplace else. We ended up putting him here.

Sam Donaldson: And he normally would be over here.

Major Tracey: Correct.

Sam Donaldson: Normally the controller responsible for aircraft en route to the no-fly zone, but not yet inside it, would be sitting here, next to the controller responsible for aircraft inside the no-fly zone, both of them facing Captain Wang. But in his new seat, the en-route controller can no longer see what his partner is doing, and he and Captain Wang have their backs to each other. Particularly troublesome because the crew had never flown together before.

Snook: Okay, you start to get some clues. I was really naive when I first started studying this because I'm sort of captured by my own culture, the Army culture. When we deploy to a combat zone, we're twenty-four and seven—twenty-four hours a day in the field, seven days a week, on all the time. When I was studying this I didn't realize until after a couple of weeks that we're only enforcing the no-fly zone in northern Iraq during (I've got to be careful here) Air Force duty hours, like ten in the morning until three in the afternoon. I couldn't believe it when I first heard that. I just assumed that, if we're going to have a no-fly zone, we're going to enforce it around the clock. But, literally, we would only start around ten in the morning. The AWACS would be the first aircraft to take off, because it would command and control all the fifty-some aircraft for the rest of the day. Come three o'clock in the afternoon, you've got to get home in time to get out of your flight suits and go to happy hour at the officers' club. Of course, you're at happy hour, so the next morning you've got that hangover, so you can't start until about ten o'clock.

Student: It's called the "cold hands club."

Snook: What happened was that they figured out the console was broken. The first plane every day is the AWACS. It takes off and goes into what's called a wake-up orbit. It flies in a little, tight orbit. It brings all the systems on line: the JTIDS [Joint Tactical Information Dissemination System], the satellite downlinks, and everything.

This is what the crew looks like in the back, just to remind you (**Figure 4**). You met Major Tracey. He was sitting there with Captain Wang in the previous video clip. While they were in this wake-up orbit, bringing all their systems on line, the equipment technician guys were really busy.

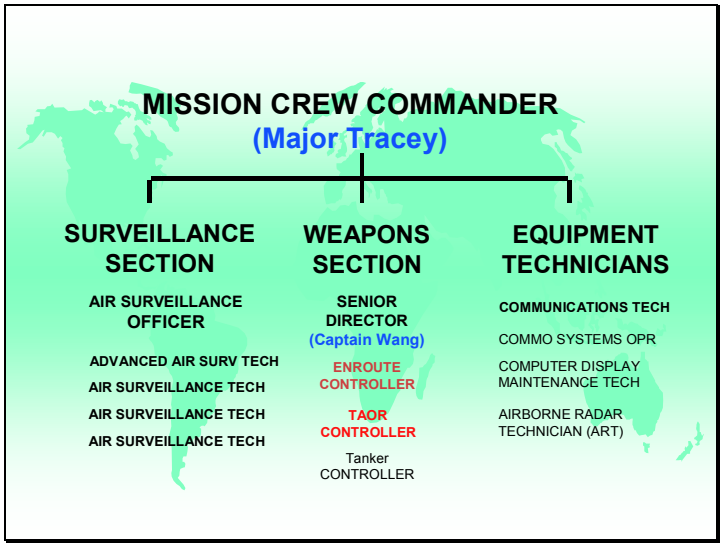

Figure 4

During the court-martial, they put all these very technical folks on the witness stand, and they wanted to know, "What did you see at 10:30 in the morning when the helicopters were shot down?" It was kind of comical. They put the first guy up there, the commo guy, the radio guy, and he mumbled, "Well, sir, I think I was a little…well, probably asleep." The lawyer said, "What? Speak up, please." He said, "Well, sir, I'm pretty sure I was asleep at 10:30." "What! What do you mean? You were on duty! It was 10:30 in the morning!" "Well, sir, you know, after I get the radios up and working and stuff, there's really not much for me to do. I just tend to get cold back there and catch some sleep." "Get him off the stand!"

So they put the computer guy up there. "What were you doing at 10:30 in the morning?" He said, "Well, sir, I'm pretty sure…it was beginning, we got everything up. I was back in the galley, you know, in the kitchen, getting the coffee and the donuts for everybody." "Get him off there!"

Then they put the radar guy up there and asked, "What were you doing at 10:30?" He said, "Well, you know, I've got a great library up there. I was reading this book. I think it was a Tom Clancy novel." "*AAAH!*"

These guys (the equipment technicians in the right-land column) really don't have much to do after they get all the systems up and running. They're very technically oriented. The ones in the middle column are the ones who are really focused there. They're the air traffic controllers talking to friendly fighters. The ones in the left-hand column are really military intelligence specialists. They're looking at all the unidentified tracks out there on the screen. They know the enemy order of battle. They are looking at the airfields. They can try to anticipate where the aircraft are coming from and what they might be doing.

That's the general lay of the land in the back there. As they were bringing the systems on line, one controller's screen was broken. Stuff happens, right? Stuff breaks. How do we handle stuff in technology? How do we handle the fact that we've got fallible components in technical systems?

Student: Redundancy.

Snook: Redundancy, right. Tell me how this works. It's based on one fundamental assumption.

Student: They bring two.

Student: Backup.

Snook: Yes, they understand the principle. Let me give you an example about airplanes. If you have a single-engine airplane and the probability that the engine can break down is .01 (I hope it's smaller than that), the chance that the aircraft is going to crash due to engine failure is 1/100. If you have two engines, what's the probability of the aircraft going down?

Student: One in ten thousand.

Snook: That's right: .01 times .01. Then if you have a third engine, you get .01 times .01 times .01. Pretty soon you get a probability of almost zero. But that whole logic of redundancy is based on one key assumption.

Student: Your plane can fly with one engine.

Student: Survivability.

Student: That the failure of one doesn't affect the failure of others.

Snook: Right. They're independent; in other words, there are no common mode failures. All three of those engines are independent.

Of course, they had redundancy. They had all sorts of excess equipment. They had a couple of extra consoles there. The guy looked at his screen, got the dreaded blue screen like your computer, and looked at Captain Wang. Do you think they held a meeting to decide what to do? Was this a common thing? A war stopper? No big deal, or a big deal?

Student: No big deal.

Snook: Some people think there's an SOP. We've got SOPs for everything. It was absolutely no big deal. Stuff happens. Stuff breaks all the time. So the guy looked back at Captain Wang, and Captain Wang said something like, "Don't bother me, just switch seats."

But there is a reason, probably, that the en-route controller and the tactical area of responsibility [TAOR] controller were sitting next to each other. The first guy handled all air traffic in Turkey; the other guy handled all air traffic in the TAOR, the no-fly zone. So, every time an aircraft took off from Incirlik Air Base in Turkey, as soon as it crossed the border into northern Iraq the en-route controller would pass the aircraft over to the TAOR guy, the aircraft would fly around the no-fly zone, and when it was ready to go home, the TAOR controller would pass the aircraft back over.

What became a big issue at the court-martial was how you transfer control back and forth between air traffic controllers. Remember, at the time of the shootdown the Black Hawks were talking to the en-route controller and the F-15s were talking to the TAOR controller. The court wanted to know, "Why didn't you transfer control?"

How do you think the controllers actually did it? What was the standard way to transfer control, do you think?

Student: Whack the other guy and point to your screen.

Snook: That's the way a dumb infantryman thinks. It's low tech, right? Whack him on the shoulder. That's the way infantrymen work. It's a high-tech aircraft, almost one of the most sophisticated pieces of equipment in the world.

That's *exactly* the way they did it. The en-route guy would nudge the TAOR controller with his elbow, wouldn't say a word, and would lean over the screen and actually point to the track as it was crossing the international border. He would look the guy in the eye, they would both nod, and then the TAOR guy had control of the aircraft. At the end of the day he'd give him back. He'd lean over and he'd point. It's a very low-tech, very robust way of transferring control.

They moved because one of their screens broke, so they couldn't do it this way. Is that a war stopper? Couldn't they do their mission anymore? Is it a little thing, or a big thing?

Student: You said that they looked at each other without exchanging a word. Do they not talk to each other?

Snook: They can. They're all wearing headsets and microphones, but they're monitoring 6 to 12 different radio frequencies, turning different ones up and down. It's called MINCOMM, minimum communications. You try not to talk on radio if you don't have to. In this case, they had a good way of doing it without talking.

Student: But they could talk audibly. Can't they stand up and say, "You have this one?"

Snook: They can. It's pretty loud in the back.

Student: You're in an aircraft.

Snook: It's really loud. You can yell—and you'll hear him talk in the video later—but it's not easy. They have an intercom on their system and he could switch to intercom and tell the guy, "Hey, you've got track 002."

Student: "You've got e-mail."

Snook: "You've got mail! You've also got track 002." You're not going to do that.

Anyway, it was just not a big deal. But there's a lot of chaos theory and complexity theory involved. I don't know if you had a chance to talk about it. It's the butterfly theory: the butterfly flapping its wings in Beijing creates a thunderstorm in Central Park in New York City. We know that in complex systems you can get huge downstream effects out of small beginnings. The day started off, and when the console didn't work, they moved controllers. That probably increased the likelihood that these guys weren't going to talk to each other because typically they were sitting next to each other.

Student: It's culture, too, as you said. You pointed it out for a reason. When we do things like that, it's positive control, and I know that when I look that man in the eye he will do a particular thing.

Snook: If you've ever watched two helicopter pilots transfer control of the aircraft, it's a very strict ritual that they go through. They actually look at each other. One says, "You got the control." The other guy says, "I got the control." It varies a little bit, but they'll go through that to

make sure that you absolutely have it before I let go of the controls. We do that. Looking someone in the eyes is a little different.

The other thing that we learned from that video clip was that, at the end, Sam Donaldson said the crew had never flown together before. Would that bother you? Do you think that's unusual?

Student: Didn't you say you were rotating them through every month?

Snook: Every thirty days a whole new AWACS crew would fly from Tinker Air Force Base in Oklahoma over to Incirlik Base. They'd fly the mission for thirty days. They'd go home, and a new crew would come. Do you think it's unusual that you'd have a crew deploy like this that never flew together before? Would it matter?

Student: I think it is just normal practice. It is quite common in this mission, ad hoc.

Snook: We have a lot of turnover.

Student: Would longer experience give them a keener sense of the danger?

Snook: We have a lot crews in the military. We have tank crews. We have air crews. We have mission crews like this. Based on group theory, it takes a while for them to come together and sort of gel as a team and become a high-performance outfit. It's just like sports. Sometimes you can take a very good team that doesn't have the best individual talent and it can beat a team of all-stars who have never played together before.

It's that same sort of notion. In fact, the Air Force knew this, and they actually had a personnel policy called *hard crewing* (**Figure 5**). It meant that if you've got a crew together to perform a mission and they fly together for a while, you kept them as hard as possible. In other words, don't willy-nilly swap people around from crew to crew if you don't have to. They had this personnel policy, because they knew that after you fly together you learn each other's idiosyncrasies and you become better at communicating and those sorts of things.

Student: Is that an AWACS thing, or this an all Air Force policy?

Snook: This is a standard Air Force policy for all crews. You try to do that and it makes sense, but, of course, in reality people get promoted, people leave the service, people die. We try to keep them together, but things are going to happen.

They had a backup to this. Before any AWACS crew deployed to Incirlik Air Force Base in Turkey, they'd have to go through two spin-up trainings. What that meant is they had to fly two full-day simulations in an AWACS simulator at Tinker Air Force Base. The crew of record that was going to fly over there for the next thirty days actually flew together in the simulator. Boeing made a special tape to simulate exactly what it looked like over northern Iraq, with the same rules of engagement, same terrain, same features. So they flew together, literally, in the simulator for two days before they'd actually fly their first mission, the whole theory being that by the time they got there they'd be gelling and be clicking like a high-performing team.

I wanted to find out if they did it. Simulators have logs like any aircraft, and sure enough, the first day they did their simulation. They were signed in, but it showed who was in the flight crew, and several key people were missing. Can anyone guess who in general, in the military, or in any other organization, misses mandatory training? What kinds of people?

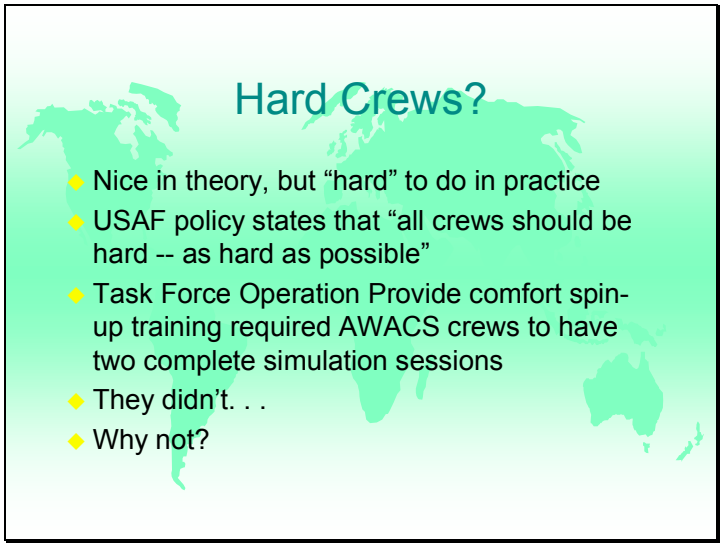

Figure 5

Student: Senior.

Snook: Senior people. The leaders, right? Okay, let’s defend ourselves. Why do leaders sometimes miss mandatory training?

Student: They’re getting ready to deploy, and they’ve got a lot of other things they have to do.

Snook: Leaders are busy people. Why else sometimes don’t the leaders go to training?

Student: They’ve been to it before.

Snook: We’ve been there; that’s why we’re made the leaders. We’ve got the coffee mug. We’ve got the T-shirt. We’ve been there, done that. They wouldn’t have made us the leaders if we didn’t know what we were doing.

Sure enough, in the first day of the simulation, Captain Wang was there, but Major Tracey was not. He was busy, and he’d done this twelve times before. The air surveillance officer, another key captain in the back of the AWACS, also wasn’t there. He had just been promoted and was going off to a new training school at the last minute. Their answer to that was that they called over to Turkey and said to the air surveillance officer in the crew that had been there for thirty days, “Hey, you wouldn’t mind staying for another thirty days in Turkey and flying with a strange crew.” “Gee, thanks!” (In other words, she said, “Yes.”) They were going to pick this woman captain up when they got to Turkey. So in theory hard crew is nice, but in reality it’s hard to do.

Then they said, “Well, that’s okay. We’ve got two spin-up trainings, so maybe the next day we’ll get them.” The next day rolled around. The log book shows an X across the date. We asked the commander, or the local person there, what happened. He said, “That day a local congressman showed up at Tinker Air Force Base.” What do you think happens these days when a congressman shows up at a military base?

Student: Full reception.

Student: A dog and pony show.

Snook: You open the barn doors and parade the dogs and ponies out. To put that in a good spin, you really believe that you have an important capability in the AWACS. They're getting old. We've got defense downsizing, so the budgets are getting cut. You really believe what you're doing is crucial and that you need new equipment, so you want to convince the congressman to give you money. Then you've got to find him an AWACS.

They scrambled around that day. "Do we have any that work?" They found, "Here we've got a crew and an aircraft TI'd (technically inspected; i.e., "ready to go"); let's fly him in this one that's ready to go to Turkey." He said, "Well, they're supposed to go through their spin-up training. That's important, isn't it?" "Yes, but this is urgent!"

They figured that the crew was going to be over there for thirty days, and after the second or third day in the country, they'd be clicking like clockwork. The shootdown happened the first hour of the first day in the country.

So, stuff happens, right? They didn't do their spin-up training. The first day a couple of people were missing. The second day there was probably a reason for it.

> **Sam Donaldson:** 8:22 AM, two U.S. Army UH-60 Black Hawk helicopters lift of from Diyarbakir, Turkey, on their way to Zakhu, a town just inside the no-fly zone, jumping-off place for a U.N. humanitarian mission. But nobody aboard the AWACS has been told to expect them.
>
> You were given a sheet which listed all of the aircraft that were expected to be in your area that day.
>
> **Captain Wang:** Exactly.
>
> **Sam Donaldson:** Were the two Black Hawks on that sheet?
>
> **Captain Wang:** No. They were not on the flow sheet.
>
> **Sam Donaldson:** Meanwhile, at Incirlik Air Base, two F-15 fighter planes are being readied for their mission into the no-fly zone to check it, or sweep it, as the saying goes, for hostile aircraft.
>
> On their kneeboards the pilots have affixed the so-called flow sheet. Any aircraft that doesn't appear on the flow sheet they will treat as potentially hostile, and if it is identified as such, their orders are to shoot it down. Several flights are listed there for April 14, but the Army helicopters are not among them. And whose fault was that?
>
> **Colonel Gaskin:** It was the Army helicopter operations and the control of those operations was [sic] the problem.
>
> **Sam Donaldson:** Colonel Bob Gaskin, who works with the Washington public policy group, Business Executives for National Security, …

Snook: What do you think his background is (before they tell you)?

Student: Air Force.

Snook: He's got to be Air Force. Listen to the way he's talking bad about the Army.

> **Sam Donaldson:** …is a retired Air Force fighter pilot. He used to have to make those split-second decisions as to who was friendly and who wasn't.
>
> Are you telling me that the Army was refusing to divulge to the Air Force that it was going to fly helicopters in at a certain time?
>
> **Colonel Gaskin:** On numerous occasions, the Army would come into the area completely unknown to the AWACS. The AWACS had no idea what their take-off time was, had no idea how long they were going to be in the area, and many times did not know where they were going.
>
> **Sam Donaldson:** That, despite the airspace control order approved by the zone supervisor, Air Force Brigadier General Jeffrey Pilkington, which said that "No aircraft will enter the no-fly zone until fighters have sanitized or cleared it." Yet, on that day, on a mission personally approved by General Pilkington, the two Black Hawks were flying in early. Of course, the AWACS radar picked them up. They even traded radio transmissions with the AWACS en-route controller. And on Captain Wang's screen their radar track displayed an "H," the symbol for friendly helicopter. But the AWACS did nothing to enforce the airspace control order, which clearly said the F-15s must come in first.
>
> **Colonel Gaskin:** The correct action, under the rules for the AWACS, was to ensure that the zone was swept and keep them outside the zone until the F-15s were able to get in there and sweep them.

Snook: Did you understand what the rule was?

Student: I have a question. They use words like, "The AWACS did not ensure or enforce." I realize that the book said that they can't talk to pilots because pilots are cocky and they won't listen to AWACS and things like that, but what is the official doctrinal version of that? Does AWACS have positive authority over aircraft in the area?

Snook: AWACS is the Airborne Warning *and Control* System. The air traffic controllers tell you what to do, and standing next to them is this airborne command element [ACE], whose call sign is DUKE.

Student: If the pilot tells them to stuff it, then what does the AWACS controller do?

Snook: Here's exactly what happened (**Figure 6**). In the court-martial they put one of these controllers on the stand, and the prosecutor asked, "If you want to tell the fighter pilot to do something, just how do you do that?" This young controller, a second lieutenant, said, "Well, sir, we'd say something like 'TIGER ZERO ONE, go to vector 180.'" Then the lawyer asked, "So, then what would happen?" "Well, sir, sometimes they would and sometimes they wouldn't."

The prosecutor said, "If you really need to get him to do something, what would you do?" The controller said, "Well, sir, if we really need to get him to do something, we would preface our

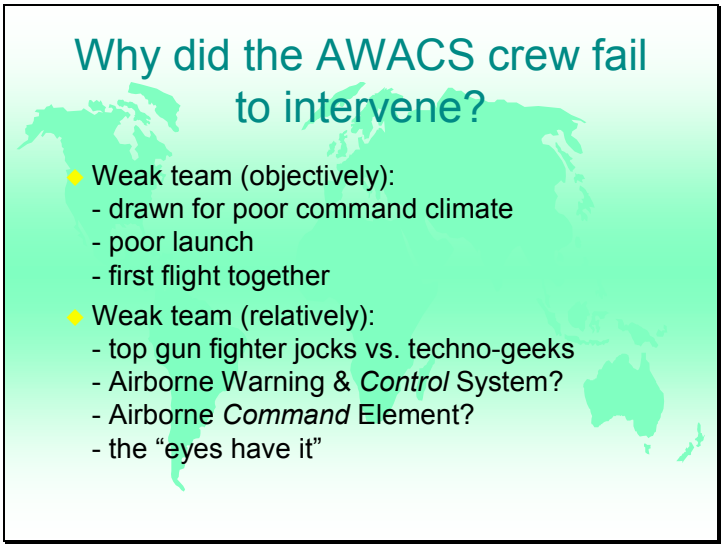

Figure 6

commands with, '*DUKE says* go to vector 180.'" DUKE is the ACE, who's also a fighter pilot, who's in the back of the AWACS. The lawyer said, "So, then what would happen?" "Sometimes they would, sometimes they wouldn't."

Student: In the frame of what that colonel was saying there, though, I think there'd be a greater propensity that if they had told the helicopter pilot to stay clear of the no-fly zone that they would have paid more attention to that, because Army helicopter pilots would pay more attention than the fighters.

Snook: When you talk to Army aviators who typically don't work with an Air Force AWACS that much, they look at the AWACS as the big eye in the sky. God. "They know all, see all, and if they tell me to land, I'm going to land. If they tell me to go here, I'm going to go there."

What we had is just what we talked about in the book. You were asking what the formal doctrinal answer is. The formal doctrinal answer is that you do what the controller tells you to do.

Student: That is because of command.

Snook: Right, because he's technically backed up and represents the chain of command.

Oettinger: One of our previous Air Force fellows, Colonel Reynolds, wrote a paper for the Program that you'll find on the Program's Web site.[3] He was a professional controller. His account of the relationship between controllers and single-seat fighter pilots corroborates this and goes into infinitely more detail. If you think it's an accident of that region, he's talking about U.S. Air Forces Europe operating in Germany, and it makes your hair stand on end.

Student: But isn't that widespread insubordination? Shouldn't these people get court-martialed?

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[3]Richard T. Reynolds, *What Fighter Pilots' Mothers Never Told Them About Tactical Command and Control…and Certainly Should Have* (Cambridge, Mass.: Harvard University Program on Information Resources Policy, P-91-7, November 1991), [On-line]. URL: http://www.pirp.harvard.edu/pubs.html

Oettinger: It's culture.

Snook: I showed you the formal organization chart with all the lines and the boxes, which is the way it is supposed to work and the chain of command (Fig. 2). Every organization has a formal chart and an informal chart.

Student: But there's also a flip side to it. If you go to the other extreme, if you look at the Soviet pilot who shot down that Korean airliner in 1983, he saw it was an airliner, but nobody asked him if it was an airliner. He just did what he was told: shoot down that aircraft.

Snook: That's a great example. You don't want either end of the spectrum. You want something in the middle.

If you had a pyramid showing how the status hierarchy works in the Air Force, what do you think the first cut is? Who's on the top and who's on the bottom? If you're in the Air Force, what is the big distinguishing feature?

Student: Fighter pilot. Rated.

Snook: You're wearing wings. "Come on; you're either a rated pilot or you're some lesser mortal." Right, so the first big cut is pilot. Then there is another cut amongst the pilots. Fighter pilot and then…

Oettinger: If you fly transports you're shit.

Snook: These are the fighter pilots; they sit at the tip of the long pointed spear. If you want to be chief of staff of the Air Force nowadays you've pretty much got to come up through the fighter ranks.

Next are the transports, the C-130s, the C-141s, C-5As, and the fighter pilots have an affectionate name for them—bus drivers. "If you're flying one of the C-15s, you might as well be driving a damn bus. Shoot, you know what I mean?" Of course, if those are bus drivers, can you imagine where our AWACS crew is, or controllers? They're bottom-feeding scum. They call them domeheads, or technogeeks.

So what you've got set up here is people at the bottom of the status pyramid telling a fighter pilot what to do with his weapon. I don't think so! It's not quite that simple, but those are the tensions that you sense there. On top of that, this flying no-fly zones is a boring job for fighter pilots, flying lazy eights all day over northern Iraq. They call them Groundhog Day missions. Does anybody remember that bad movie with Bill Murray (I think), where it's always Groundhog Day, so every day is just like the last one?[4] Not only is it boring, but then you also get some second lieutenant, some non-rated technogeek domehead, telling you what to do with your weapon and how to fly your plane. In general, they would let them know that. If a controller would give a direction, just by the terse response they'd get from the pilot he'd know that basically, "Don't bother me." So they were very reluctant to try to tell fighters what to do.

Student: It seems to me that the chain of command is a very fundamental principle of the military, and it wasn't even on the list of things that went wrong that Secretary Perry noted.

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[4]Trevor Albert (producer), *Groundhog Day* (Hollywood, Calif.: Columbia Pictures, 1993).

Student: You've split TACON [tactical control] and OPCON [operational control], so the guy who writes the fighter's fitness report is not the same guy who's trying to give him direction over the skies. That's where the "DUKE says" thing comes in, I think; it is that the guy who actually can affect the pilot's life is nowhere involved in this.

Oettinger: Yes. This is a very, very important point. If you want to pursue that further, there's another book by General Jack Cushman on command and control that you'll find in our bibliography that goes into that in enormous detail.[5] Cushman was another person who collaborated with the Program for Information Resources Policy. He was on the staff of Congressman Nichols, and he details exquisitely this particular point, where the person who gives an order, as in this kind of situation, and the person who has court-martial authority over the guy who receives the order, are in two different organizations.

Student: This happens throughout the military! When I was a deck officer on a Coast Guard cutter, I had nothing to do with the performance report of the engineering officer who reported to me over a pipe.

Oettinger: So if I want to court-martial the guy, I have to go up and across and down to find somebody in another service who will court-martial his boy for doing something wrong in my environment. The Goldwater–Nichols Act, among other details, addressed that kind of thing, so that over the last ten years the CINC, the actual commander, now has the authority (rather rarely used) to call a court-martial on somebody who is chopped to him—in his operational control—but is in another service. So, there is somewhat greater authority. It has not been used very wisely.

Student: But isn't it painfully obvious that it is one of the root causes, perhaps more so than some of the others that Secretary Perry listed?

Snook: You'll actually hear it later. Sam Donaldson will ask Captain Wang straight up, "You knew the helicopters were out there, so why didn't you tell the fighter something?" and you'll hear Captain Wang's response. He said "Look, the eyes have it. Those are fighter pilots out there. I'm sitting looking at a radar screen. There's a fighter pilot out there that put his eyeballs on the target. I'm looking at a blip on the radar screen. He said he's got it. At that point I shut up. I am not going to screw up his engagement. I've got a warrior out there who's looked at the target. He said, 'You shut up and don't say anything.' He's involved in a combat engagement." You hear it very clearly.

The downside is that you get involved based on your being removed from that. You don't know what it's like to be a fighter pilot, and they're out there doing their thing. So they're very reluctant to get involved.

Oettinger: This is not a cultural thing. The flip side is that you look at the arguments between the field commanders, in general, and the guy back at headquarters, and it makes very good sense. Suppose that you have the president of the United States sitting in the Situation Room in the basement of the White House, and there's a guy out there in Vietnam, or Desert One. Do you want this guy in Washington to tell you what to do?

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[5]John H. Cushman, *Command and Control of Theater Forces: Adequacy* (Washington, D.C.: AFCEA International Press, 1985); *Handbook for Joint Commanders* (Annapolis, Md.: U.S. Naval Institute, 1993).

Snook: He's certainly in the chain of command. Jimmy Carter was sitting there monitoring the whole operation in the Iranian rescue attempt.

Oettinger: There's a whole bunch of practical wisdom that says that the person on the ground should have the authority, and not some remote higher authority. Again, you've got a balance here: two principles that are both valid. You have chain of command and you've got eyeballs on the target, and they are both good things.

Student: Sir, it still seems that it's a doctrinal issue, because it didn't distinguish which one of those two things took precedence.

Snook: Do you think doctrine can answer this question for you?

Student: If it's enforced, sure. Why not?

Snook: But the doctrine can't distinguish between friend and foe.

Student: It's a judgment thing.

Snook: It is sometimes.

Oettinger: How's doctrine going to tell you which side you want to be on in a particular situation?

Student: The doctrine does to some degree. Maybe in this particular case the AWACS controllers could possibly, potentially, think about controlling aircraft, but they don't have the same radars and stuff that even our local radar controllers have. That's one. Two, if you're talking about a battle, there's no way they could control all the different aircraft. However, there's something that I haven't heard said here that I would have expected, and that is for the AWACS to tell them, "Okay, we understand you see Hinds; be advised there are U.S. Black Hawks in the area," and at least put that thought into the pilot's—the warrior's—mind.

Snook: It was doctrine that typically when a new aircraft would enter the area, in this case the combat zone, they would get a picture call. In other words, when every one of those fifty aircraft flying in the no-fly zone for the rest of that day would enter northern Iraq, typically they'd call the AWACS and say "Picture." The AWACS would say, "You've got some Wild Weasels up in the northwest. You've got two helicopters flying down in the southeast. You've got a KC-130 doing a tanker operation," and so on.

You ask why they didn't do that? You'll hear their response. Sam Donaldson asked them, and they said, "What a great call that would have been." Clearly, when they entered the area, if they had just said, "Hey, there's only two aircraft out there. It's two helicopters," that would certainly have been enough for these guys to double-check before they shot. It is, in fact, doctrine to do the picture call, which they didn't do.

I just want to finish this point, though, while we're on it. In the back of the AWACS crew, look at all those people we've got (Fig. 4). We've got the aircraft commander, who's the pilot. The DUKE—the ACE, the airborne command element guy—was not in the original AWACS crew design. First of all, with a call sign like DUKE, and an acronym like ACE, even if I don't tell people, he's got to be a fighter pilot, right? You don't waste call signs like that on some bus driver or some techno-geek. Why do you think they put the fighter pilot in the back of the AWACS?

Student: To help enforce that radio call.

Snook: To help with this judgment thing. One reason is, "You're going to be controlling fighters. Wouldn't it be nice to have someone back here who understands what it's like to be out there." The other is to give it some sense of legitimacy. The fighters wanted one of their own in back of the AWACS who also knew what was going on.

Student: Except this guy was an F-111 pilot.

Snook: They put the DUKE on the stand during the court-martial (I actually remember this footnote in the book), and he said, "There was some confusion about what was on the screen right prior to the shootdown." They just asked him straight up, "Sir, what did you see on your radar screen just prior to the shootdown?" He was a big guy, decorated, with a southern drawl (I can't do it), and he said, "Sir, me looking at that radar screen is kind of like a pig looking at a watch." I never heard this expression before. Have you?

Student: I've heard "a dog watching television." That may mean a back-seater for an F-18.

Snook: That might be it. A back-seater is the same thing. But it's like a pig snorting around in the mud and comes across a watch. The watch means nothing to the pig, and what the DUKE said was that he was standing in front of a radar screen, he was in a position of authority, he was the airborne command element, and he didn't have a clue what he was looking at.

Now, he was a rated pilot. He'd had radar theory. He had radars on his airplane. But you bring up a good point. These radars are very different. As you watch the rest of these video clips, you might be picturing in your mind's eye a very clear picture: two planes here and there.

Student: These are digital.

Snook: When you watch it, you'll be able to see the screen. There's a lot of noise on there. It's not as straightforward as you might think it is. What the DUKE was saying was, "I didn't have a clue." So we had a guy in a position of authority who didn't understand air traffic controller tracks and everything—at least that's what he testified in the court-martial.

Student: And he wasn't a fighter pilot.

Snook: F-111 is close. But he was better than a bus driver.

Student: It was the same thing when they assigned us an ALO [air liaison officer]. We asked them, "What did you just get done flying?" These air liaison guys on the ground with us would say, "They just deactivated a bunch of B-52s. I'm a B-52 pilot," and we'd say, "*Agghh*!" Whereas if he turned to us and said, "I'm an A-10 pilot," we'd say, "Oh, *good*!"

Snook: Do you think that's great duty? Do you think a fighter pilot likes to fly around in the back of an AWACS all day? You're not going to get the best people. In fact, the DUKE and his counterpart on the ground who pulled these duties were, typically, at the end of their careers. This wasn't the best thing to be doing.

We're trying to figure out why the AWACS crew didn't do something. They knew that there were helicopters out there. They were not a real team yet because they missed their spin-up training, and it was their first mission.

Do you remember some of those quotations from the book? We wanted to know what it was like to be an AWACS crew member in the AWACS community during this time, to get some sense of the organizational soup, if you will, that we drew our fateful crew out of. They actually happened to have done a quality of life survey in the AWACS wing about a month prior to the shootdown and we went back and got some of those quotations (**Figure 7**). Here are a couple of them. Remember, nothing had happened yet.

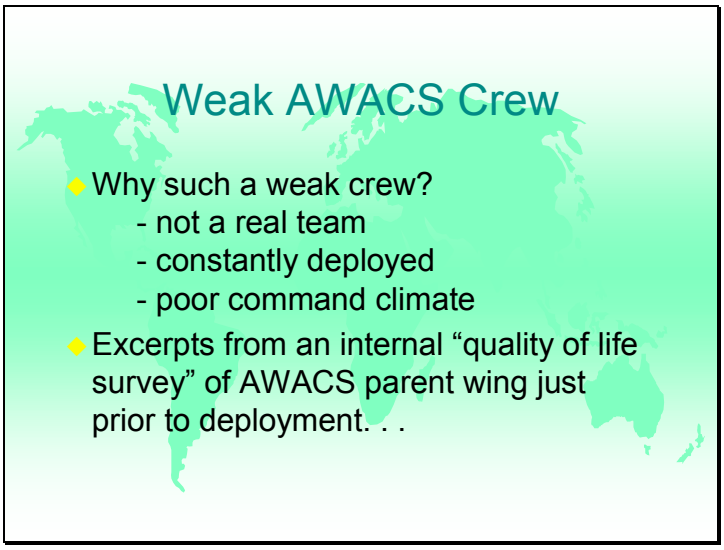

Figure 7

> I'm an experienced aircraft commander. I've been around aviation all my life and have a very good idea of when to take note of a dangerous situation. We now have a dangerous situation.
>
> Our senior leaders are not interested in communicating with the troops, let alone listening to their concerns. To quote a chief I've interviewed, "It will take a serious tragedy—an airplane and crew loss, due to their [senior leadership's] indifference before they, in their ivory towers, wake up to the realities of AWACS today." Hopefully, we will wake up to the fact that our aircraft are getting older much faster, and our troops are getting younger every day. A potentially deadly combination.
>
> The people are tired, and the aircraft are in just as bad condition. At the present rate, it will take a major accident before anything is done. At that point, it may be too late for some of us. The average crew member feels like a piece of meat, when in truth, the meat is treated better than us.

Give a soldier or airman a chance to write, and you get the creative writing flair, right? One last one.

> The mission is important, but grinding people to the bone by sending them TDY [temporary duty missions, like this one] 180 to 200 days out of the

> year to complete the mission can't continue without bad consequences. I don't think it will be too long before there's an accident that brings this to light. The jets and people in this wing are tired.

So, if you were a typical AWACS crew member during this time, you were gone between 180 and 200 days out of the year on missions like this.

Oettinger: May I, however, put this in context? Take the boss who gets this, and let's say he's sympathetic. He goes higher up the chain, and he says, "I need more budget. I need more whatever." Let's say they're sympathetic, so now it goes to the secretary of the Air Force and the secretary of defense and gets into the budget cycle. It comes before Congress, and somewhere along the line there's a congressional committee that has heard this from eighty-five agencies all across the board: "We need more money because our people are demoralized." That's true of the Registry of Motor Vehicles, of the FBI, of the Forest Service, et cetera. The member of Congress says, "Well, gee, I want to get reelected and therefore I'm going to keep the budget down, because otherwise the taxpayers are going to revolt."

Again, this is not so extraordinary. It sounds prescient. I don't deny that they said it, but you've got to put it in the context of the balancing act that says everybody and his brother has a demoralized organization where a catastrophe will happen unless it gets more money. Ultimately, whoever dispenses the money at whatever level looks at that and has to make judgments about whether or not they can at least give them some money.

Student: I'd go a little bit further. A lot of these gripes are the same gripes you hear on any deployment after about the third or fourth month. People get worn down. They get tired and they start saying this. Furthermore, 180 to 200 days a year is normal for being on board a ship in the Navy. They spend 180 or 200 days a year at sea, and it's part of their job. That's the military. That's the way it is.

Student: You've also got to look at it from the perspective that in January 1993 we had a new foreign national security policy called "engagement," and our operational tempo skyrocketed. When was the AWACS designed?

Snook: This is a very old system that's been upgraded numerous times. The AWACS is housed in an aging airframe.

Student: So, there's a huge procurement, development, fielding, and training tail before all of a sudden you turn and stand your national security strategy on end. If you were in the cold war forever, it was a pretty steady-state thing, but when you all of a sudden just do it, you find you don't have the tools and the people to do what you want to do.

Snook: There are a lot of issues here. If you're the commander and you get this survey back, how do you make sense of this? Is this normal bellyaching? We have a saying that "When the troops stop bitching, that's when you need to worry." Now, clearly, you've got to put it in context with other indicators. If you're a good commander, you're out there doing this all the time.

When asked, the commander's take was, "You know what? This is as bad as we've seen it, and that's in over twenty years in the AWACS community. 'More with less, more with less, more with less.'" After the end of the cold war, if you were a CINC deployed in any Third World country, the first thing on your wish list was an AWACS. It's a great command and control

platform. You're out there where you don't have anything. So he really said, "Op tempo is up 600 percent. We cut the size of the force by a third." But then he went on to say, "But what am I supposed to do? I felt this way six months ago. I felt we couldn't do one more tasking six months ago, and of course we've done four of them since then." He walked his finger up to the edge of his desk, and he said, "How do you know when you're at the edge?"

Student: How do you say no?

Snook: Same question. He said, "How do you know when you're about to fall off? I thought we were about to fall six months ago. In the military, to get promoted it's a can-do culture. You say, 'Can do. Yes, sir, got it. We can do it.' And in the last six months I didn't think we could. I said, 'Yes, sir, we can,' and we did. So, how do you know when you reach the edge until you're looking over it or you fall off? And, of course, what happened? The Pentagon calls and you get another task to go to Kosovo. And after you get out your map and try to figure out where the heck that is, what are you going to say? Are you going to say, 'Hey, hold on a minute, the troops in this wing are tired. Just a second. We've got a dangerous situation out here.'"

Student: "An officer, who interviewed a chief master sergeant, says,…"

Snook: Right. It's very difficult. Even if they bought it, they've got problems downstream. But for the local commander to try to say, "We're broke; we can't do any more," goes against the very nature of the type of people we promote. They're going to say, "Can do! We'll find a way to make it happen. I know it's important; you wouldn't ask if it wasn't important."

This does give you some idea. Now, of course, guess what happened after the shootdown?

Student: They probably got kicked out of the service.

Snook: No. They gave them several additional crews and aircraft. They found the edge. They fell off it. Now we close the barn door after all the horses are out. But this is not atypical.

Oettinger: If I may put that in the context of a lot of the other things you've heard this semester, consider all these questions about Y2K, information warfare, et cetera. Nobody has the vaguest idea where the edge is. Just to contrast these two situations: in this instance, somebody clearly fell off the edge, but the rhetoric in the information et cetera business, as in the intelligence business, is pre-catastrophe. That's like living in San Francisco wondering when the big one will hit you. You know it's on the San Andreas fault, but, meanwhile, folks are buying up real estate in the Bay area.

Snook: "After it comes, we'll rebuild the buildings with tougher building codes…but afterwards." Would it make sense now to do that?

Oettinger: No. Like in Kobe.

Snook: Yes. Let's move on.

> **Sam Donaldson:** 10:26 AM, the helicopters land in Zakhu before beginning their mission to the Kurds. Of the twenty-six men and women buckling up to fly on the next leg, fifteen are American.

Joan Piper: The day before the accident, she'd gone to Cairo with her fiancé and I said that, you know, it's all bearable missing her so much because she was so happy.

Allen Hall: I'm the one that got him started flying and he enjoyed it. But he was a very conscientious person, especially about flying.

Kay Mounsey: There was this infectious laugh about Erik. As long as he was having fun he thought everybody around him was having fun with him.

Erik Mounsey: All right! All right!

Sam Donaldson: The mission commander was Colonel Jerald Thompson.

Eileen Thompson: Jerry had called me at six or seven o'clock in the morning his time to tell me he was flying, also to tell me what the plans were for the next few days, because he was leaving Saturday morning to come home.

Sam Donaldson: 10:35 AM, the two F-15s lift off from the base at Incirlik. Captain Eric Wickson is the flight leader, Lieutenant Colonel Randy May his wingman. 10:54 AM, the Black Hawks lift off from Zakhu, bound for the town of Irbil, a hundred miles to the southeast, even deeper into the no-fly zone. They radioed the AWACS to say …

Captain Wang: …that they were airborne, flying from Point Whiskey to Point Lima, and those points represented…

Major Tracey: Zakhu and Irbil.

Sam Donaldson: Who did they say this to?

Captain Wang: Lieutenant Hassily. He was the controller on the en-route frequency.

Sam Donaldson: But they were in the no-fly zone, and aren't you supposed to go to the no-fly-zone frequency?

Captain Wang: The helicopters wanted to stay on that frequency, and in practice, in reality, that's the way it was done.

Sam Donaldson: Yes, for a long time, the Army had frequently failed to change to the correct frequency within the no-fly zone, and the Air Force had not enforced it. The stage was set for tragedy. The Army helicopters weren't on anybody's aircraft flow sheet. They weren't supposed to be in the no-fly zone before the F-15s had swept it clean. They were talking to the wrong AWACS controller, who that day was physically separated from the right controller for the no-fly zone and their boss, Captain Wang. But there was even more.

> **Colonel Gaskin:** The IFF problem is one of the factors, I think, that killed those people.
>
> **Sam Donaldson:** The IFF, identification friend or foe electronic device, is carried on military aircraft such as the Black Hawk. When another aircraft, in this case an F-15, hits it with an electronic signal set to the secret code it's on, it signals back or "squawks," as the saying goes. But if the two aircraft are not on the same code, the IFF doesn't squawk, suggesting it is not a friend.
>
> **Colonel Gaskin:** Had the Black Hawk helicopters been squawking the correct IFF as specified in the op order, they'd be alive today. There's no doubt in my mind.
>
> **Sam Donaldson:** Why weren't they?
>
> **Colonel Gaskin:** They goofed up. They made a mistake.
>
> **Sam Donaldson:** The F-15s were using the correct code for aircraft inside the no-fly zone, but the helicopters, though inside, were still using the outside code. They had failed to make the switch.

Snook: Can you believe all these things were going wrong? Are you shaking your head, or what?

Student: Unbelievable.

Oettinger: It's a conspiracy.

Snook: How could you not know where that embassy was, right?

Student: We just went over that.

Snook: These are some of the best trained, best equipped people in the world to do what they're doing. There's a long history of success, and yet there are these kinds of mistakes.

Let's try to figure out how they can happen. Remember, one of Secretary Perry's bullets was: The Army helicopters weren't very well integrated into the overall Air Force-heavy organization or task force. If you look down the left-hand column of the next slide (**Figure 8**), all the things you heard in that video clip are really just evidence or indicators that somehow the Army's helicopters are just not meshing in this organization.

They weren't on the F-15s' flow sheet. Remember, that's a sheet on the pilots' kneeboard. It's a graphical description, very good for situational awareness. You can look right there. You see where you are and chronologically where you fit into all the other aircraft that are in front of or behind you. They were in front of the fighter sweep. Remember the Air Force only opened the no-fly zone from 10:00 AM to about 3:00 PM. The first mission every day into the no-fly zone, after the AWACS was set up and on station, was typically a two-ship flight of F-15s. They have a very powerful down-looking radar. They would literally fly up and down the mountain valleys before anybody else came in and sweep it or sanitize the area to make sure that nobody snuck in while they were at the all-ranks club having a drink. So they didn't want anybody out there in front of them before the sweep.

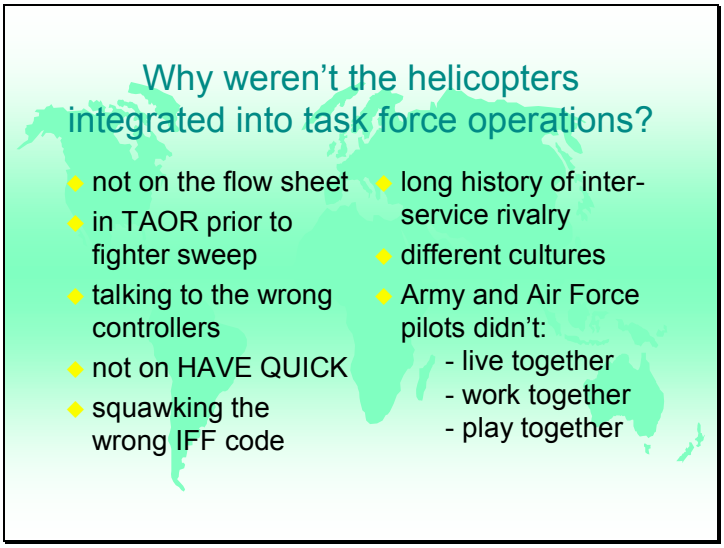

Figure 8

We had helicopters out there before the sweep on this day. They were talking to the wrong controllers: they were in the no-fly zone, but they were talking to the en-route controller. We covered that. They were on different radio frequencies (I'll talk about that), and they were squawking the wrong IFF code. You just shake your head. How could all these happen? Let's take them one at a time and see if we can make sense of them.

They were not on the flow sheet. I deputized you all as Air Force investigators, so if you wanted to find out why they weren't on the flow sheet, you would go to the horse's mouth: to the clerk who typed up the flow sheet that day. That's what they did. They went to a young airwoman and said, "Is this your handiwork for the 14th of April?" She said, "Yes, that's mine. I made this one." Then they asked her, "How do you get it so small? Do you shrink that on a copier so that it fits on the knees?"

They had the airspace control order, which is a big bible of rules, and they said, "Now, have you read the airspace control order?" She said, "Yes sir, I have." They were thinking, "That's good," because when every airman comes into the operating area they pass around copies so that you have to read it and sign off on a sheet saying that you've read it. Of course, you only have two copies and they've got a big crew, and they give you an hour, so you pass it around and you read your section. Then the investigator opened it up and said, "Here on page 223, subparagraph 111, bow-legs alpha two, right there, highlighted in yellow, did you know about that rule that says, 'All coalition aircraft will be listed on the flow sheet'?" "Yes, sir, I know about that." Then he said, "Okay, here's the big question. There are no helicopters on the flow sheet. All coalition aircraft are supposed to be listed on the flow sheet. Did you know that the Army helicopters were flying that day?" "Yes, sir. I get their flight plans every day." "So why weren't they on your flow sheet?" Straightfaced, the young airwoman just looked at him and said, "We just don't consider helicopters to be aircraft." After they sort of pried his fingers from around her neck, is that really so unbelievable?

Student: The reason the Army can have helicopters is because we've legally agreed that they're not aircraft.

Snook: Way back when, when the Army started to get into the business of rotary-wing aircraft (it was before the Key West Accord, but that was about arming them, I think), the Army got around it by saying that's not really an aircraft, because it's not meant to fly. It's got the propeller on the top instead of the front.[6] What's up with that? But, literally, in her world, in her culture, in the Air Force fixed-wing culture for controlling aircraft, that's not an aircraft. Fixed-wing aircraft are very nice to control. You can plan them. They take off at a certain time. They fly in a straight line. They land at a certain time. Helicopters land, they shut down, they turn off, you can't follow them, they fly low, and they get behind mountains.

Oettinger: If you think this is ancient history and cannot happen again, as we speak there is a bureaucratic battle going on over control of information-related operations. Who's in this? The U.S. Space Command, or whatever they're called these days. "Cyberspace is space," or some such argument. Anyway, they're running out of nuclear devastation to do, so they want this mission. Now, I can guarantee you that, regardless of how this comes out, there will be some compromise made, and five, ten, or fifteen years down the road there will be a class sitting here saying, "How come this could have slipped?" The answer is: "Because in order to make the compromise, they declared that Apple computers would belong to the Space Command and IBM compatibles would belong to the Army." This is not the end of the story, ladies and gentlemen.

Student: It goes beyond that airwoman, because in the regulations, in the airspace control order, I'm sure there are also written rules about incorporation into the air tasking order every day. Within that there are procedural and positive controls for the routes that Army aviation uses. Below a certain level…

Snook: But the real rule that trumped all of them was that rotary-wing aircraft were not allowed to fly above 2,500 feet, and fixed-wing aircraft were not allowed to fly below 5,000 feet. So there's a zone of separation. and, basically, the Air Force controlled fixed-wing aircraft. They were most worried about mid-air collisions. If you talk to AWACS controllers, they say, "It's so hard to track rotary-wing aircraft, but as long as they stay down below that deck and our guys stay up here, we just don't care. They're hard to follow anyway. We lose line of sight from the AWACS. We can't talk to them because they're down in the valleys."

When they go behind a mountain, and the AWACS loses line of sight, the track keeps following in the last known vector, speed, and direction, and the AWACS hopes it'll pop up again pretty soon. If it doesn't pick up on an active track, eventually the track goes right off the end of the screen, and it's just a pain in the butt.

Student: From a practical standpoint, you also run into that this was a relatively peaceful time. If you're talking about a theater and a campaign and so forth, then it becomes a little bit clearer as to why the helicopters mainly fly to support the Army assets. You can't have the AWACS controllers trying to control or do anything other than maybe be aware that there's an Army campaign going on down there with a bunch of helicopters. The Air Force doesn't ask the Army, "When are you shooting off your howitzers?" and so forth.

Snook: In our box we do. The Army is on the ground down there.

Student: We need to be coordinated.

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[6]The 1947 Key West Accord divided defense missions and responsibilities among the armed services.

Student: This task force is a unique animal. Because the Army is on the ground down there, I own all the airspace above me and I own the ground, and the Army's responsible for the airspace only. It's a big difference.

Student: Over him, yes.

Student: But I think your point is well taken. It's AirLand doctrine. Helicopters pop up behind trees, do their business, and go back down. They are trained to operate so that they can't be followed or seen.

Snook: Right. They want to stay low, yet then the AWACS can't talk to them. You will see how this plays out eventually.

Student: That's not an excuse.

Snook: It just makes it hard.

Student: It comes back to how you plan it. There should probably be a change in doctrine if you're not doing close-air support or those types of roles with the helicopters, or if you're not moving logistics just to stay up with the Army. If you're flying passengers, as they were in this particular case, then maybe there should be exceptions to the rule where their flight plan is filed with the Air Force.

Student: Then it comes back to how you drew the graphics. When I say "the graphics," I mean the line to the TAOR (Fig. 4). We're kind of bound between the border of Iraq and the border of Turkey, and that's Turkey's sovereign airspace. You can't really move the line, but you want your graphics to stand alone. When that helicopter flies in there—and it can just sneak across the border and land to pick up VIPs or whomever—you can get into a sense of, "Why am I going to change my radio and start squawking something different when I'm only two or three miles inside the line?" As an operational planner, you step back from that and you say, "If something bad is going to happen it's going to happen in the crack of my map when they're reading on a dark night, and that's where it's dangerous."

Snook: It's always on the border. In fact, that's the answer to why they were talking to the wrong controllers.

Why did they break that rule? It seems like the most obvious rule ever. If you're in *this* airspace, you've got to talk to *this* airspace controller. If you're in *that* airspace over Turkey, you talk to *that* one.

Student: Every time you switch radio nets, there's a potential for failure.

Snook: Right, and here's what happened. Remember, the Air Force is located at Incirlik Air Base, pretty far away from the Iraqi border. Helicopters don't have the same range, so they are located at some remote radar tracking station out in the middle of the desert with old beat-up World War II Quonset huts that leak. They've got one TV that they have a lottery on to pass around, while the Air Force guys are in these high-rise hotel-style apartments.

Student: As it should be.

Snook: Typically, 95 percent of the helicopter flights, up to this time, flew from their little base in Turkey just to the MCC, a little helipad. They off-loaded people or supplies, they picked up

people or garbage, they flew back out, they flew back in, flew back out…. Can you see what happened?

Student: You switch nets. The guy on the other side maybe wasn't expecting it, or something happened, or maybe something got dialed in wrong. He doesn't pick you up. The guy you were talking to before lost you, so now he starts checking secondary net to see if you're there.

Snook: And you already had that shut down.

Student: Right. You go back to primary to see if you can find him…

Student: You're always presupposing that the AWACS is up and receiving data. He might not even be above you. Most of the time he was not.

Student: Every time you switch nets, it's a point of failure.

Snook: The MCC was only 300 meters across the border in northern Iraq. You're on final approach, you're trying to land this helicopter, which was never meant to fly to begin with, and at the same time the rules are telling you that you should switch controllers and switch radio frequencies. It makes sense to break this rule! Ninety-five percent of the time this is as far as you go, and it just doesn't make sense to do that while you're trying to land the helicopter. You heard the people saying essentially, "Well, the helicopters seemed to want to do that, and over the years that's just the way it became."

There are written rules and there are emergent rules. People in organizations usually don't break rules because they're malicious, or because they're saying, "Let me see how many rules I can break." Most people in organizations break rules for very good reasons. In this case, 95 percent of the time it made a lot of sense not to switch controllers.

Oettinger: In your book you quoted something about espoused theory versus theory in practice. Chris Argyris has a couple of books in which he goes into great detail on this relationship between espoused theory—the official doctrine—and theory in practice and the reasons why these tend to deviate.[7] Scott quotes him extensively in his book, but any of you who are interested in organizational behavior may want to read Argyris's books.

Snook: So you could look at this point in two ways. You could say, "This is a rule-breaker," and throw the book at him (no pun intended), or you could say, "This is the definition of expertise." Experts adapt to the local situation and make decisions based on what they see around them, and make the right decisions. Ninety-five percent of the time the right decision was not to switch controllers. But you can see what happened: over the years it just became a rule, from the AWACS perspective, that helicopters talked to the en-route guy, and that's whom they talked to. Of course, this day they landed at the MCC, and then they were flying on to Irbil, deep inside Iraq, and nobody thought about the changed situation: "This is that 5 percent where we're going deep inside, and we really should switch to the other controller."

It's really important that a lot of the rules that get broken involve well-meaning, good people in organizations just trying to get their job done. A lot of times rules written from a global

[7]Chris Argyris and Donald A. Schon, *Theory in Practice* (San Francisco: Jossey-Bass, 1974).

perspective, a long time ago, by someone who was not close to the action, just don't make much sense to local operators.

Oettinger: Again, to give you a common civilian example, one of the ways, at least in the United States, for people to go on strike in a labor dispute without going on strike is to follow the rule-book strictly.

Student: The blue flu.

Student: Work to rules.

Snook: Policemen or nurses all call in sick, or they work exactly the way they're supposed to work.

Student: They refuse overtime. They just do exactly what they have to. Pilots always do, "I'm in the bag."

Oettinger: We depend on this for most systems to work most of the time. These are not mythologies.

Snook: They're not bad people. These things happen more than we'd like to think they do.

That takes care of that one. How about the fact that the helicopters were in prior to the sweep? Do you remember the previous video? We know how this happened, right?

Student: This is a VIP thing and you go by the schedule of the VIPs.

Snook: This was not some ash and trash, hauling supplies around. This was a high-visibility mission where they had to go to a village deep inside the no-fly zone.

Army aviators, helicopter pilots, are very customer oriented. They fly missions where people come to them and say, "We've got to be at a meeting in Irbil at noon on the 14th of April." The aviators do their backward flight planning, and they say, "Two ships. We can get you there." Then they say, "Oh, in order to get you to Irbil by noon for your meeting, we're going to have to cross into the no-fly zone before the Air Force is scheduled to open it that day. But, you know what? You're the customer, we don't ever say no to the customer. Just stand by, we'll find out if we can get an exception to policy."

That's exactly what they did. Remember, in the earlier video, they actually sent a memorandum up to General Pilkington. Now, picture General Pilkington sitting at his desk. He's an F-16 pilot, but even pilots have to fly a desk every now and then. One day, going through the paperwork in his in-box, he gets this memo from the Army. He thinks, "Oh, they want me to let them go in before the sweep. That's not a good idea, because there might be bad guys out there. That's an important rule. You shouldn't let them break that, but, you know, that's an important mission they're flying. I know that United Nations agencies and staff have got to be at that mission for the village chiefs at Irbil. One-time exception." You saw him: he circled "Approved," and put it in his out-box.

It's the little things. Did you ever wonder what happens to things that you put in your out-box? (Not those of you who don't have jobs, but if you have a desk.) Generals would have some stuff to put in their out-box. I've been a general's aide, a secretary to the general staff, so I know what happens to the stuff in a general's out-box. When the old man gets up, you come running in,

you take the out-box, and you dump it on your desk. He comes back and sees his clean out-box, and he feels like he did a good day's work.

Student: This would have gotten routed back to the Army.

Snook: This is what I'm asking you. You're the general's aide or secretary to the general staff, and you're going through this stuff and here's a note. "Let's see, it came from the Army. The Army asked a question. The general answered it and signed it." What are you going to do with it? You're certainly going to send it back to the Army.

Now, the Army is out in the middle of the desert. They get this memorandum back, signed by the general and approved. They call the customer and say, "Hey, we're good to go. The general says we can go in early today." What else do you assume?

Student: That the Air Force already knows about it.

Snook: If the general signed it, you're sure that everybody knows, and so you fly. You have no idea, without going back and checking, who else got that memorandum. By definition, it was an exception. It was outside the normal flow or routine of communication.

We know who didn't get it. The F-15 wing never got a copy of it. Clearly, if the F-15 pilots knew that the two helicopters were going in early that day, as an exception, they certainly would have known exactly what they were looking at.

Student: But the F-16 wing knew the helicopters were out there, yes?

Snook: F-15s are high-altitude, air-to-air engagement, air superiority aircraft. They rarely ever fly low. In fact, these two pilots went into their flight logs, and they only flew low twice, for familiarization: 500 feet over the ocean, flat. In their own words, both pilots said it scared the shit out of them. You can't imagine what it's like, flying low at that speed. Even if you've flown a helicopter at 120 knots over tree tops, it's enough to scare you to death, but 500 knots over the ocean….

Here we've got another situation where we were asking them to do something in an operation that they were not really trained to do. F-15s never fly low. They don't intercept helicopters. They were in a pseudo-combat situation, and they were fish out of water.

Now, guess what? Right across the street from the F-15 squadron was a squadron of F-16s. F-16s are all-purpose aircraft. They fly low all the time. We went to the F-16 squadron and we looked at the flow sheet for the flight of F-16s. A two-ship flight of F-16s was ten minutes behind the F-15s that day. The helicopters were on the kneeboards for the F-16 squadron. They're on there every day.

Of course, General Pilkington is an F-16 pilot, so when he flies as a normal pilot, he sees the helicopters on the flow sheet every day. He's inspecting his organization while he's flying it, and he says, "Things look wired together. The Army is on there; the Air Force is on there." Had he gone across the street and looked in the F-15 squadron, he would have seen something different. Why didn't the clerk include the helicopters over there? Because they weren't considered aircraft. She also got so much information that she had to filter some of it.

The helicopters were down low. F-15s never fly low. We should probably not clutter up the flow sheet. Besides, people's legs are only so long, and you can put only so much on the

kneeboard. So, you can see it's the little things that start adding up. There are no bad people here yet.

Now we know why they were in front of the fire sweep: because they asked for and got permission to do it. They were talking to the wrong controllers, because it made sense most of the time.

There is a coordination mechanism of last resort. If all the paperwork and planning and liaisons work, if everybody is on the same sheet of music, and if everybody in the no-fly zone is listening to the same radio frequency, it doesn't matter if they never got the word. If you're flying along in your helicopter in northern Iraq, and you hear two F-15 pilots say, "We're about to shoot down two helicopters," you'd probably say, "Hey! Let me wiggle my tail a little bit, and make sure that's not me you're looking at."

Why weren't they all on the same sheet? Why weren't they at least monitoring the same radio frequency? At the time, a new generation of radios came out: a frequency-hopping radio that's wonderful. Picture the dial spinning a thousand times in a microsecond. You can't jam it; it's almost impossible. The difficult technology is getting them synchronized. You can't field new technology to everybody all at once. Those of you who send e-mail a lot know that if you send a PowerPoint presentation to someone and that person sends it back to you and says, "I couldn't open it because… ," you've got to save it as an earlier version. Not everybody gets the latest upgrades all at once with new technology. It's a simple lesson, but it's happening every day.

The Air Force happened to get this new radio first. They were flying in a combat zone and wanted to use it. So, when they were in the combat zone, the no-fly zone, they used their HAVE QUICK radios. The Army didn't have them yet, so they couldn't hear each other. The Army could have told the Air Force, "Look, not everybody has it. Let's use the old radios." But the Air Force just didn't think it was important to be listening to the Army guys.

We've got to finish up with this one (Fig. 8). There is still a piece of the mystery in this. They were squawking the wrong codes. Every day around the world, out of our National Security Agency, we change our radio call signs, passwords, frequencies, IFF codes, and pass them around the world through secure means. Immediately after the shootdown, the Air Force guys flew out to the Army headquarters, and they had the one-page sheet that had the IFF codes on it for that day. The Air Force investigator went to the Army guy and said, "Let's check our codes. Let's make sure that we're squawking the right codes." The Army guy looked at him and said, "What?" He said, "Let's check our IFF codes," and they almost got into a fight because the Air Force guy said "Code*s*." The Army guy said, "Don't mess with me. Look. Here's our code for that day."

There were two codes. There was one for Turkey, one for the no-fly zone. No one ever told the Army that there were two codes.

At the beginning of the operation, three years before, the KISS (acronym for "Keep it simple, stupid!") principle was employed and there was only one IFF code. All coalition aircraft squawked the same code. As close as we can tell, about two years prior to the shootdown a staff member rotated into the headquarters staff. He had three weeks on the staff. He was going to get a rating, and you've got to make your mark. He was an operations security guy. He said, "Oh, only one IFF code! We've got civilian airspace, Turkey. We've got a combat zone, northern Iraq. We should probably have a different IFF code for flying in Turkey." So he wrote up a recommendation to go to two codes, and sent it up to his boss. The boss said, "Oh, yes. Two codes are more

secure; more secure is better." He approved it, gave the guy a commendation medal or whatever for a good idea, and sent him on his way. The Air Force changed the policy to two codes.

The first part is that the Army never got the word. Now, suppose you're invited to a party and they don't tell you what to wear. You put on a tux and a bow tie; you get there, and it's a pool party and everybody's wearing a swimsuit. The point is, you didn't get the word that it was a pool party, but as soon as you get there you realize you didn't get the word, because everybody's wearing a swimsuit and you're wearing a bow tie.

So, one part is: how could the Army not get the word when they made the change? Clearly, as soon as they started flying inside the no-fly zone, people were going to realize that they didn't get the word, because they were squawking the wrong code. This is, perhaps, the most damning evidence about how truly disconnected the Army flight operations were from the Air Force. The helicopters flew for two years, all the while squawking the wrong code, and the AWACS knew it, because the AWACS actually picks up the exact code you're squawking. The Army flew hundreds and hundreds of missions, squawking the wrong code in a combat zone, and nobody told them. Nobody cared enough (not in a touchy-feely sense) about the Army helicopters even to look at the code that came up on their screens and compare it to the codes and say, "Hey, you're squawking the wrong code."

Student: If they stayed under the en-route controller, then as far as he's concerned they weren't squawking the wrong code.

Oettinger: I had a conversation today with one of my colleagues who has a pacemaker. About two months ago, when he was feeling bad, his cardiologist told him he was about to die of congestive heart failure. They treated him for congestive heart failure. About a week ago he went to see his pacemaker guy, who said, "Your pacemaker is out of adjustment" and twiddled one little knob, and all the symptoms disappeared. It wasn't congestive heart failure. It was a maladjusted pacemaker, and the pacemaker guy and the cardiology guy didn't talk. Guys, it happens daily under highly professional circumstances.

Snook: I've got to tell the last story on the IFF mystery.

This was only one of the modes in codes. There are four different modes in codes in IFF. We won't get into all that. The other part is truly a mystery. We don't know why they used mode four. They were squawking the right mode-four code, because it was being read and everybody knew it. They re-created it with the same F-15 aircraft (different helicopters, obviously) right in the same airspace, and they can't figure out why that part didn't work.

But here's the other piece. Remember the sheet that comes out every day, the classified document that has the new codes on it? If you're out in the Army headquarters you get a new sheet every day. Two-thirds of the way down (I have the sheet) it says "IFF," followed by a colon, then there's a space, then there's an alphanumeric string, which is the code, and then there are spaces and another alphanumeric string. That's what it looks like in the Air Force one. The first one is for Turkey. The second one is for the no-fly zone. But it doesn't label that one's Turkey and one's combat zone.

The Air Force guys asked the Army guys, "Where's your sheet for today?" They took the two classified documents, they held them up to the light (and this is Mike Nye's[8] and my story, at least, the best sense we can make of it), and they were absolutely identical except for two-thirds of the way down, where it said "IFF." On the Army one, it was just a colon and a space and one string. The point is, you wouldn't know by looking at it that you were missing a code, because it didn't say "second code" and then there was a blank.

So, they asked the Army operations guy, "Where do you get your sheet? It's just like mine for today except it's missing that code." The guy said, "I don't know. It comes out of the fax machine." It's a secure fax machine. The Air Force guys asked, "Well, where does it come from?" The Army guy said, "It's plugged into the wall." He didn't know. The operations guy rotates in and out every couple of weeks, and the machine was working when he got there.

My friend Mike was the operations officer by default on the day of the shootdown. The commander was killed that day, so he became the commander of Eagle flight. He went back and traced it. The best Mike could tell was that when they set up the original communications network for Eagle flight and the helicopters out in the middle of the desert, they routed it through some Turkish unit out in the middle of the desert. Basically, a Turkish soldier with a NATO security clearance came in really early every morning. He had a secure fax machine, and one of his duties was to take the hard copy of that day's modes and codes that came from the Air Force, pull out a U.S. laptop computer, and put in a Word document disk with a template that was made at the beginning of the operation. Can you see it coming? He started tabbing through. He looked at the hard copy for the day, changed the date, tab, changed the call signs, tab, changed the passwords, tab, tab, tab. IFF. He had room in the template to type in just one code, but there were two codes on the hard sheet, so he put the first one in, tab, tab, tab, hit send, and electronically it came out at the other end. It looked exactly like the other sheet, and you wouldn't know that something was missing.

Student: The guys at the other end didn't complain.

Snook: They didn't know, because no one told them. You think they'd have found out. That's Mike's best guess. What a bizarre way to have this happen! Lots of random error could come into retyping that stuff. I find that part really hard to believe.

The right-hand column is my explanation (Fig. 8). I had it covered up. We won't go into any great detail on this, but you are all aware of it. When you get to the real roots of this, there is just this long history of interservice rivalry. They are very different cultures. We're rarely collocated. We rarely train together. We rarely play together. Even in this operation they were located at different locations, with different languages, different training. Hopefully, we're getting better at this, but, in general, those are the real cultural roots, at least, in my idea of what led to this.

Let's get on with the shootdown, so we can get to the end.

> **Sam Donaldson:** But even so, the AWACS, which was tracking them, knew they were friendly.

[8]Captain Michael Nye (USA, retired), the Army operations officer on the day of the shootdown.

Snook: They were squawking the wrong code, but it didn't matter. The AWACS picked up the code they were squawking and was talking to them, so they knew they were friendly. They knew they were there. That was the point.

Sam Donaldson: You had them displayed on your scope, did you not?

Captain Wang: Yes, after they left Zakhu.

Sam Donaldson: And they were identified as friendly, were they not?

Captain Wang: They sure were.

Sam Donaldson: You were tracking them. What happened to them?

Captain Wang: We lost contact with the helicopters because of the radar limitation, because of the mountain, because of the distance.

Sam Donaldson: 11:13 AM, one AWACS officer notices the signal drop off. He programs a huge electronic arrow on the last known position to draw it to Captain Wang's attention. An alert light begins flashing. But Captain Wang takes no action. Sixty seconds later, the arrow and light disappear.

Colonel Gaskin: At about this time, as they lost the returns, in come the F-15s.

Sam Donaldson: Almost immediately, forty miles off their nose, the F-15s see returns?

Colonel Gaskin: Correct, and they asked the AWACS, "We see something out here. Do you have anything?"

Major Tracey: The controller responded, "Picture clean."

Sam Donaldson: Picture clean, nothing there. That was it. The Army helicopters were on their own. The F-15s were closing in for the kill.

On the morning of April 14th, 1994, two U.S. fighter planes were bearing down on unidentified radar blips inside the Iraqi no-fly zone, the pilots primed to shoot down hostile aircraft. They checked once with a U.S. AWACS radar surveillance plane flying overhead and were given no help. Now, they checked again.

Colonel Gaskin: They asked the AWACS again. "Do you have anything? We've got contact out here." And the AWACS replied, "We have hits."

Major Tracey: A contact could be a helo [helicopter]. It could be a jet. It could be a bird. It could be a car. It could be any number of things.

Sam Donaldson: And Lieutenant Wilson looked at his scope and he replied?

Major Tracey: He replied, "Hits there."

Colonel Gaskin: Very important that word "hits." What he's telling the fighters is something is hitting my radar scope, but it's not a friendly aircraft, because if it was a friendly aircraft the AWACS would have said, "I've got a paint," and he did not tell that to the F-15s.

Sam Donaldson: Remember, the AWACS had temporarily lost the helicopters behind mountainous terrain. But now, the hits were back on the AWACS scope. Not only that, but because the AWACS, unlike the fighters, was reading all IFF codes, the hits were carrying the symbols for friendly helicopter, an "H." That is what the evidence shows was on Captain Wang's radar scope.

Colonel Gaskin: According to the accident report, they went back, played the tape, and there it was. The helicopters were right where the F-15s were looking.

Sam Donaldson: Was he asleep?

Colonel Gaskin: Who knows?

Sam Donaldson: Once before, you were accused of sleeping on duty. Is that correct?

Captain Wang: Uh-huh.

Chuck Niven:[9] The consistent report was that he had a hard time staying awake in class and in the simulator.

Sam Donaldson: Chuck Niven was the supervisor of Wang's AWACS instructors at Tinker Air Force base in Oklahoma City.

Chuck Niven: And the recommendation was that this was a person who could do the job, was capable of doing the job, but this was a serious problem that we had seen repeatedly.

Sam Donaldson: Were you asleep that morning?

Captain Wang: No.

Sam Donaldson: Your scope was showing an IFF return, was it not?

Captain Wang: No.

Sam Donaldson: It was not?

Captain Wang: No. All we saw was radar.

Sam Donaldson: Wang insists that, once again, the IFF friendly symbol had disappeared from his scope. But why didn't he have his controllers compare notes—one of them was talking to the helicopters, the other to the F-15s—and issue some sort of warning? The Air Force charges that

[9]Captain Wang's AWACS instructor.

Captain Wang failed to supervise his controllers properly, failed to maintain a current and accurate tactical picture of the no-fly zone, and failed to ensure that the F-15s had that accurate picture.

Major Tracey: I know my guys didn't do anything wrong. We didn't pull the trigger. We didn't order, we didn't direct, we didn't detect.

Snook: Just to stop that a second, here it is (**Figure 9**). This is the leader of the AWACS crew defending his crew's inaction by saying, "We didn't do anything." We're trying to figure out why they didn't do something, why they didn't intervene, and his excuse was, "We didn't pull the trigger. We didn't direct. We didn't detect."

Figure 9

Remember, going back to our original discussion, AWACS is the Airborne Warning *and Control* System. Remember the pyramid and the status? That's one way we can understand why they didn't do anything. I think the other one (I won't go into any great detail, and I cover it in the book) is this notion that sometimes, when everybody is responsible, no one is. I call it the fallacy of social redundancy. Remember the Kitty Genovese murder, where the lady got attacked coming home late at night, and all these people saw it but nobody did anything?[10] If I fell over right now in this room and clutched my chest…

Oettinger: I'd save you.

Snook: Thanks, Tony, I didn't think anyone was going to say anything. But do a thought experiment. Try, as best you can, to think how you'd feel if I fell over right now and started convulsing. Would you get out of your chair? Would somebody go to the phone? What would you do?

[10]In 1964, Catherine Genovese was murdered in the courtyard of her apartment building in Queens, New York. Thirty-eight of her neighbors heard her screams for help or witnessed at least one of the three attacks involved, but no one intervened or called the police.

Oettinger: 911.

Snook: I'm in good hands.

Student: Give me the phone.

Student: Don't go to *that* phone.

Snook: Now, let me change the situation. Say we took a break, and you were the only one in the room, and I fell over.

Student: You're Army, right?

Snook: Now, wait! That's a bad example. Even my captain back there was in on it!

But you see the difference? If there were many of you here, and I fell over now, you'd think, "Well, he's closer" or "This guy might be a doctor." You'd have a lot of excuses for not acting, because you'd think somebody else will do it.

In the back of the AWACS that day, you had everybody looking. When it's very important, we put in redundancy, like the extra airplane engines. The problem with social redundancy is: They're not independent, like aircraft engines, so you don't get the effect of redundancy. In fact, you build high-performance teams to make them interdependent. Everybody at that time was looking at the screens, but nobody really was. Can you imagine how that can happen? They were all thinking somebody else was watching the screen. The stuff was going on in front of them. Nobody was really paying any attention to the helicopters.

Student: Did they see different things, or were they all seeing the same thing?

Snook: They can physically set their screens to see the same information. They can customize them by zooming in and out, but everybody had the same information available to them.

Here's the actual shootdown.

> **Sam Donaldson:** Now it was the F-15s' turn to make the final, fatal mistake. With no hint of a friendly flight on his flow sheet, no report of friendly aircraft from the AWACS, and no response to his own attempts at electronic IFF identification—remember, the helicopters were on the wrong code—Captain Wickson, the flight leader, does the final thing required. He goes in to make a visual identification. Flashing by 500 feet above, and 1,000 feet to one side, he consults his silhouette book of Iraqi aircraft, and he thinks what he sees is an Iraqi Hind helicopter with missiles attached to its wings. Certainly, what he sees does not look like the U.S. Army Black Hawk to him, because…
>
> **Colonel Gaskin:** They had wings or sponsons and huge fuel tanks for the extended range for the mission they were flying that day.
>
> **Sam Donaldson:** And that looked like a Hind?
>
> **Colonel Gaskin:** The pilot had never seen a Black Hawk configured that way.

Sam Donaldson: The confusion over similarities in shape was one thing, but what about color? U.S. Army helicopters, like the ones flying that day over northern Iraq, are painted dark green. However…

Colonel Gaskin: Iraqi helicopters are, in fact, tan—sand brown. So, if they saw a green helicopter, obviously, it's not an Iraqi helicopter.

Sam Donaldson: They didn't know that?

Colonel Gaskin: They didn't know that. Their training wasn't up to speed.

Sam Donaldson: Captain Wickson completes his pass. Now, he asks his wingman, Lieutenant Colonel May, to confirm his identification that the helicopters are Hinds.

Colonel Gaskin: In Colonel May's testimony, he states that if his flight leader was so convinced that they're Hinds, who is he to argue? He doesn't know any better. He has enough challenge at 450 knots to avoid not only hitting the ground, hitting the mountains, avoid running into the helicopters running up his flight leader's tailpipe, he doesn't have time to pull out a book.

Sam Donaldson: Colonel May flashes past…

Colonel Gaskin: He looks over and he says, "Tally Two." In other words, "I see the two helicopters." But it wasn't the correct call. He should have said, "Confirm Hinds." Now, the flight lead should have come right back and said, "Negative two. Confirm Hinds." He didn't do it.

Snook: Here it comes. We'll show you.

Student: The delete was on.

Major Tracey: We hear him say, "Engaged." So now they're about to employ ordnance.

Sam Donaldson: You were aware of that?

Captain Wang: Right. And our training is, you know, listen, shut up and listen.

Sam Donaldson: Why wasn't it pertinent to say something to the F-15s, to say, "Fellows, watch out! There are some Army helicopters somewhere down there."

Snook: Get 'em, Sam!

Major Tracey: What a great call that would have been, you know, if somebody had had the situational awareness, I guess, to make that call, but, unfortunately, they didn't.

Sam Donaldson: The shootdown was under way.

Snook: I've got to tell you, there was a Kurdish TV news crew in the valley in northern Iraq with production quality video equipment, and they captured the entire shootdown from the ground in living color, which to me is pretty bizarre. This next part you're going to see is KDTV.

> **Sam Donaldson:** At about this time, a Kurdish TV cameraman on the ground takes these pictures of the two helicopters. Captain Wickson comes in from behind. At about four miles back, he fires an AMRAAM [advanced medium-range air-to-air missile] radar-guided missile. Watch carefully.
>
> **Colonel Gaskin:** The cockpit is involved immediately in a fireball and the aircraft impacts very, very steeply, almost vertically.
>
> **Sam Donaldson:** Captain Wickson, code-named TIGER ONE, radios his wingman, Colonel May, code-named TIGER TWO.
>
> **Captain Wickson:** TIGER ONE, splashed one Hind.
>
> **Lieutenant Colonel May:** TIGER TWO, you're engaged for the second one. He's off my nose, two miles right past the fireball.
>
> **Sam Donaldson:** Now Lieutenant Colonel May swings into position, also from the rear, his quarry aware of what had just occurred.
>
> **Georgia Bergmann** (mother, PFC Mark Ellner)**:** There were fourteen people in this helicopter that were aware in those seconds that they're coming after them to destroy them and they're trying to get out of the way, and they can't.
>
> **Sam Donaldson:** Colonel May selects a Sidewinder heat-seeking missile and presses the trigger button. From his gun-camera video you see the launch, here.
>
> **Lieutenant Colonel May:** Trigger copy, splash one Hind.
>
> **Sam Donaldson:** And the flash of the hit, here. Actually, Colonel May added a comment which was deleted from the audio transcript provided by the Defense Department, but which PrimeTime obtained—a comment that he surely must now regret.
>
> **Lieutenant Colonel May:** Stick a fork in him! He's done.
>
> **Captain Wickson:** Say it again?
>
> **Lieutenant Colonel May:** Stick a fork in him. He's done. Recommend we go do a pass over and film it.
>
> **Sam Donaldson:** The F-15s then flew over the wreckage, and May continued.

Lieutenant Colonel May: There's the smoke. The right-hand smoke is mine. There's one of them. Here comes the second one. Nobody's there. Nobody could survive that.

Snook: Let me just finish with "Stick a fork in him! He's done." It sounds pretty harsh in retrospect, knowing what we know, but these guys were pumped up. They did exactly what they were trained to do, or overtrained to do (**Figure 10**). Everything seemed to work. They were doing their mission. They went back to a hero's welcome. It was actually six hours later before they were sitting outside General Pilkington's office and heard on a TV news broadcast—CNN, our country's best intelligence-gathering network up there: "We interrupt our regularly scheduled news program to bring you a bulletin from our overseas European office. Out of Incirlik Air Base in Turkey, Operation Provide Comfort, two Army helicopters reported several hours overdue." They were on top of the world, ready to go in and tell the boss about their shootdown. They heard that on the TV, and they were saying, "No way. No way. We did everything right. It couldn't be."

So, "Stick a fork in him. He's done." He did what he was trained to do, what the country asked him to do. Six hours later, he realized he had killed twenty-six friendly people.

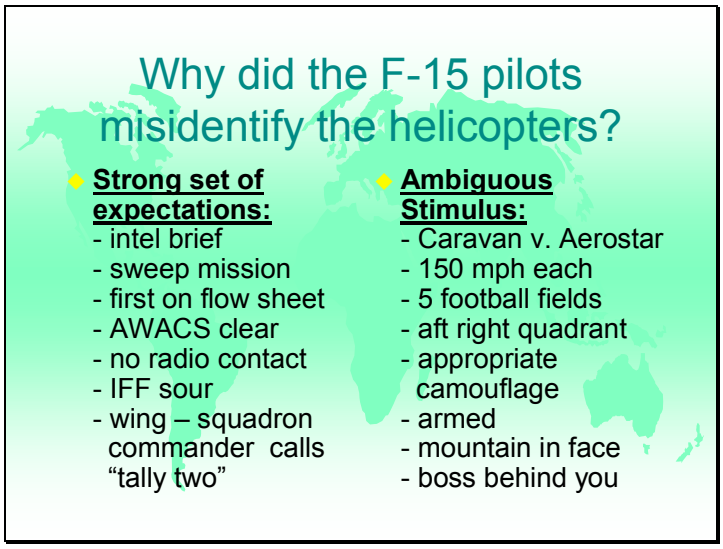

Figure 10

Student: What was the result of the court-martial?

Snook: Captain Wang was the only one who went to court-martial.

Student: Was he convicted?

Snook: No. All this stuff came out, and they said, "We're not going to hold this one mid-level captain responsible."

Oettinger: I will just hold you for one second and thank you very, very much. There is one small ironic epilogue. You know that for each speaker I've had a small token of our great appreciation. It is fate that today, due to a chain of circumstances…

Snook: A chain of events?

Oettinger: …I don't have it. So my gift to you, my friend, is a screwup.

Snook: That's appropriate. A normal accident, in a highly reliable organization!

Oettinger: But I will make it up to you. If we can find the damn thing, we will put it in the mail to you and get it to your home.

Snook: Thank you very much.

Acronyms

ACE	airborne command element
AWACS	Airborne Warning and Control System
CFAC	Combined Forces Air Component
CINC	commander in chief
CLOR	Center for Leadership and Organizations Research
IFF	identification friend or foe
MCC	military coordination center
NATO	North Atlantic Treaty Organization
OPCON	operational control
SOP	standard operating procedure
TACON	tactical control
TAOR	tactical area of responsibility
TF	task force
USAF	U.S. Air Force
USMA	U.S. Military Academy
VIP	very important person

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