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# CENTER FOR PUBLIC POLICY EDUCATION

ALBUQUERQUE PANEL

PANELISTS:

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**Al HYDE: Introductions**

KEN JOHNSON: My name is Ken Johnson. I am from Canada, which explains why I talk this way and it's just one of those outcomes of having North American Free Trade that I'm on this panel. I started life as an Air Force pilot. I then spent a number of years flying a flight calibration aircraft calibrating NAVAIDS in Canada, managed a number of the Canadian airports for several years and then moved into the Canadian counterpart of the National Transportation Safety Board, where I was the senior public servant for about 20 years until I left the government about a year and a half ago. And that about covers it.

JIM HALL: My name is Jim Hall. I'm from Tennessee. Most of my training has been in -- I'm sorry. I am a law school graduate and an attorney, but most of -- what I've been trying to say is most of my professional life has been in public service, and I've worked in the United States Senate on two different Senate staffs. I had a private practice in my hometown of Chattanooga, Tennessee, served six years as chief of staff to the governor of Tennessee and seven years as chairman of the National Transportation Safety Board. And I presently have a consulting practice in Washington and Chattanooga.

JIM HULL: I'm the U part of the Jim Hall/Hull duo. I'm state forester of Texas. I've served on -- as chair of the Fire Committee of the National Association of State Foresters. I also represent the states on the Wildland Urban -- that's not right. Yeah, the Wildland Fire Leadership Council. This is the national group of the directors of each of the federal agencies, the chief of the Forest Service, representatives of Interior and Ag as we look at the big policy issues relating to fire.

Perhaps more importantly than all of that, I think I probably come to represent the user end of aviation and am very, very much interested in all aspects of where we're going. In fact, I haven't heard a thing in the last two months that I felt wasn't very relevant to what we're all about in making our job safer, more effective and all of the other things that you read that our commission is all about.

BILL SCOTT: I'm Bill Scott. I'm the Rocky Mountain bureau chief for Aviation Week & Space Technology magazine, a former Air Force officer, was a flight test engineer in the Air Force and out. For about 12 years tested a bunch of military and civil airplanes and am a commercial instrument multi-engine pilot. So I'm on this panel primarily because I've been writing about some of the problems that this sector has had this year in particular, and because of the airplane testing background.

JIM HALL : I'd like to welcome everyone here this morning and let you know that all of the panel members -- obviously we will be here through the entire day and you are welcome, as Al mentioned, to come up and formally give your

presentation. And also in breaks or any time you want to come up and chat with any of us about anything that you're concerned about, we're available to you. With that, I'd like the first panel members, if they would introduce themselves and you can begin your presentations.

MATT ZYMEC (ph): My name is Matt Zymec and I'm with Aeroflight Incorporated and I've been in this business for 24 years. I worked for Hawkins & Powers for a number of years and in 1986 I purchased Aeroflight and I've been an operator since 1986. I operate four DC-4s -- or, excuse me, three DC-4s and three CL-215s manufactured by Canadair. And I came today I think to look at what the future might hold for our industry. Modernization ideas and some concepts and maybe, if time permits, some other things on down the line.

With me to my left is Ben White (ph). He is an aerospace engineer and a DER, designated engineering representative of the FAA, who does any engineering problem solving for our company when we have it. There may be some questions you may have of aircraft certification or how we know to tank an airplane or don't know, and I can explain it somewhat but Ben is here to give us a little more technical help if we need it.

MR. : Yeah, please. Do you have any sort of formal presentation?

MATT ZYMEC: Well, I just have an outline here I'd like to start with and --

MR. : Yeah, just start talking now then.

MATT ZYMEC: -- go down.

MR. : We'll all wake up here in a minute --

MATT ZYMEC: This is very easy rehearsing in the motel room --

MR. : -- and probably ask a question or two.

MATT ZYMEC: -- but now that we're here, it's a little bit intimidating. Anyway, you know, historically we've tanked a lot of airplanes and generally speaking the reason that we don't use most of them was because the operators that had them left the industry and went out of business. We've moved on to bigger, faster, more modern airplanes and as a result, we have today what we have.

A number of years back we wanted to modernize and go further with all turbine airplanes and we entered a program where the P3s and C-130s were made available, and we started down that road. And I think the goal at that time, which I think started in 1987 or '88, would have been that by now we probably would be operating an all turbine fleet here in America. Due to some problems with the program and whatnot, that hasn't happened yet.

And then we've had some accidents this summer that have raised a lot of concerns, and that's the reason we're here. I know that you have entertained ideas,

been presented with different ideas for a number of different aircraft, some including swept wing jets and others. And personally I think that the airplanes we use are good from a philosophy standpoint. That the low speed, propeller driven airplane, whether it be piston driven or turbine driven, is probably what we need for our industry. There are some options. There are some purpose built aircraft out there, some of which I'm familiar with.

I operate some CL-215s. I was flying a CL-415 in Canada this weekend. It's a marvelous airplane, but the problem we have is our budgets historically have been low for what we do. And the airplane I flew on Saturday was $23 million. I was at a hangar in Sault Ste. Marie, Ontario, where there was $200 million worth of CL-415s under one roof. I don't know what $200 million would do to our industry's program, but I think in the province of Ontario they probably have spent more money on their program than our whole country has. So I think any modernization effort is going to require a significant increase in funding for our program.

Leland Snow has some air tractors he makes, 802 agricultural type airplanes. An 800-gallon airplane is $1.3 million today. Once again, it's very expensive. We put together a DC-4 last winter that's on contract as we speak right now, and we put about $500,000 into that DC-4 and that was with new engines, new propellers, an overhauled tank. The airplane looks good, it has good radios, it's a nice airplane. But it's probably the most expensive DC-4 airplane out there, so the leap or the step from what we currently operate to anything that's more modern, financially there's going to be some big steps that are going to have to be taken.

And I think that's one of our biggest problems. We have some other options, in my opinion, for modernization. We can do enhanced inspection programs on the existing airplanes, which I think we're entering into now, and there may be some opportunities for some airplanes -- some of the Douglas series airplanes and the P2V Neptune to do a turbine refit on the airplane and modify it. These are all millions of dollars, no matter how you look at it. And when you buy an airplane or when you convert an airplane, it's my opinion that the least expensive part of owning an airplane is buying it, and then the expense begins.

So I guess off the top I would like to in some ways defend a lot of the philosophy that goes into what we're currently doing, but ask that for the future it's going to be very difficult to move forward unless there can be some changes in how money is budgeted and paid to the people who operate and serve this industry.

MR. : Do we have any questions for this panel?

MR. : Well, we -- no. We appreciate your comments. You know, I want to just assure you and assure those in the audience that are here -- I mean, this panel was selected and I guess there have been numerous studies I have found every time I -- I was in Boise yesterday and every time I go I find another study that's been done. So I don't know exactly how many studies have been done. The only thing that I found that is probably unique about this panel is all five of us are basically outside of the industry, as Jim mentioned. He is in the situation of being a user and it's not a situation of anybody defending anything as far as we're concerned. We're trying to

get enough information to try and come up with some findings that we hope will be helpful to the Forest Service, and obviously to those people who are responsible for fighting wildfires in our country.

Now, the contracting situation -- we had testimony from a gentleman with one of the companies that contracts about his efforts, and I confirmed this with the contracting officer yesterday, his efforts to get TCAS which he had actually bid in his contract. But evidently he was the only one of the companies that was bidding in that year that had bid for TCAS. And one of my personal interests obviously as you look at the avionics on this plane and the -- that are being operated. There are no flight data recorders, there are no cockpit voice recorders, there is no TCAS, there is no information or technology on there to evaluate how the plane is being operated, and these are old planes and they're only certificated to be operated as they were in the military. I was wondering what's your view, or your expert might tell us in regard to what type of technology is presently available that might be used on these aircraft to ensure their safe operation in the future so we wouldn't have two tragedies like we had this fall -- this past summer, I'm sorry.

MATT ZYMEC: With respect to TCAS, we're all putting TCAS in this winter. That was a contract requirement that has to be done by next spring.

MR. : Do you know why it was turned down before and why the other members of the industry didn't demand TCAS before?

MATT ZYMEC: No, I don't. That's the fairest answer I can give you.

MR. : Okay. No, that's fine. It's just that TCAS has been around a long time.

MATT ZYMEC: TCAS has been around a long time. In fact, I attended one of the first TCAS meetings back in 1995. We had had a midair collision at Ramona, California, where a Beech (ph) Baron ran through the tail of a DC-4 in the traffic pattern at the airport. And as a result of that, within -- literally within days or weeks in Ontario, California, we had a representative from B.F. Goodrich (ph) Flight Systems came and talked to us. He presented a case for TCAS. Most of us weren't real familiar with it. It was in the airline -- in the commercial industry at that time.

But I attended the meeting. I volunteered to go to the meeting and I was flown to the meeting in a CDF airplane as a guest. I had a airplane on contract in Southern California at the time and I volunteered one of my airplanes and offered to put it in as a test basis. And I think ultimately they elected to go with one of Aero Union's P3s. And they put the TCAS unit in and flew with it, and I think the results were favorable. The reports were good on it and that we should do it, and that's about where it ended.

Then unfortunately about a year ago we had another unfortunate midair collision in Northern California with two CDF aircraft and the TCAS issue came up again, and this time they've made it that they're going to help pay us to put TCAS in this winter and we have to have it in before the start of next season. So with respect

to TCAS, that's the history on TCAS as I know it with respect to our aircraft in the Forest Service or the firefighting agencies' request or involvement.

BILL SCOTT (?): May I? On the structural side of things, maybe you or Ben could give us an idea of what kind of money would it take to ensure the structural integrity of the existing fleet? If you can do it, you know, by saying these types of airplanes would be the best investment, these types of aircraft would not. If you could give us that kind of breakdown, we'd appreciate it.

MATT ZYMEC: Well, I think that we're reviewing those things right now to see what the expense would be. There is structural analysis, there's flight strain surveys, things of that nature. In fact, I have a letter here and I think the letter has been sent to you from a man in Canada who has offered to set our aircraft up with recording instruments and do flight strain surveys on them. Earlier --

MR. : Are you familiar at all with the work NASA did in the '70s on --

MATT ZYMEC: I'm aware of it. I'm aware of the fact that they did do some work and the results of their work apparently said that what we were doing was not that rough on the airplanes, is the impression that I had.

MR. : That's not the study I have, unless you have another study.

MATT ZYMEC: Well, I don't have any studies. That was just brought to my attention this morning by one of our guests in the back. So I'm aware of it, and that's about all.

MR. : Okay. Well, I'll be glad to -- I have a copy of that study. I'll bring it down at the break.

MATT ZYMEC: Okay, I'd like to see it. We have a man here in Canada who has called and he has offered to instrument our airplanes and do some flight strain survey type work. And as a result of that, it could show us what the loads imposed on the airplanes are in doing our mission. And as a result of all that, it could help us schedule periodic inspections, NDI type inspections and so forth. Help us determine what the frequency of that inspection interval might be, just to help prevent what happened this summer from occurring.

As far as cost, we don't know. We've had estimates for stress analysis of our individual aircraft and the cost estimates have ranged anywhere from $200,000 to a million dollars per aircraft type, depending on who it is you might talk to. Those are the types of things I think that you were looking for, Bill. Is that the --

BILL SCOTT: And that's just to get the data, is that right?

MATT ZYMEC: That's just to get the data.

BILL SCOTT: Doesn't count what it's going to take to do the actual work?

MATT ZYMEC: As far as any modification --

BILL SCOTT: Any mods or --

MATT ZYMEC: No. That would be over and above.

BILL SCOTT: And that doesn't include tearing them apart, taking a look. It's just instrumenting and doing the survey. Is that right?

MATT ZYMEC: Well, I think the flight strain survey --

BILL SCOTT: And the analysis of --

MATT ZYMEC: Stress analysis on the airplane?

BILL SCOTT: I'm just trying to figure whether -- that 200K to a million dollars, what does that cover?

MATT ZYMEC: From what we can gather, that would be doing an engineering stress analysis on the aircraft. Is that right, Ben? Let's let Ben address that.

BEN WHITE: Bill, what we're going -- what we'll be trying to do there is a damage tolerance analysis of the aircraft. The attempt would be made to identify the critical locations and apply fracture mechanics to these older airframes. This has been done for other airframes in the industry. The fracture mechanics approach has been performed on other airplanes in the industry, but hasn't been applied to the tanker fleet yet. The modifications that have been done to the aircraft that are tanked out there -- installation of the tank makes them a bit unique. They also operate in a bit of a unique environment, the low level operation. Consequently, the existing analysis that's out there won't apply to these aircraft so we have to perform a new analysis on these models.

That's where the expense starts to run into. We need to do the damage tolerance analysis to determine where the inspection points would be on these aircraft and the term of the inspection intervals and techniques. The construction of some of these tank aircraft is such that the techniques for doing the inspections may be difficult on some of the airplanes, particularly like the C-54, DC-4. They have a fairly open architecture so inspections on those aircraft will be relatively simple. The more complicated ones may be types like the C-130s. Due to their material types used, the shorter critical crack lengths, you'll typically find in an airframe like that the techniques that you would have to develop for the inspection may be more costly than you'll see in some of the older planes that were developed using lower stresses and typically more ductile materials. Again, you'd have to run the analysis, do the whole work up on the aircraft to determine exactly what you've got. But generally speaking, that's what you're going to find in the end.

MATT ZYMEC: And I think as an industry right now we are all moving in that direction. I know C-130 operators are doing that as we speak, and we are looking

at that ourselves. Ben and I are looking at it for our company, what we're going to do with ours. And we've talked to Bombardier about structures and structural analysis on their products. And as it turns out, a lot of their equipment is already manufactured to an MSG3 manufacturing study group.

BEN WHITE: Manufacturing steering group.

MATT ZYMEC: Steering group, which incorporates damage tolerance assessment in the manufacture of the airplane. But we are looking into it for all of these types of airplanes.

MR. : When you all interface with the Forest Service, who do you interface with?

MATT ZYMEC: It depends what the reason for the interface might be.

MR. : Safety?

MATT ZYMEC: Typically, we would deal with -- we could deal with people a the local level, at the base -- at the tanker base where we are, at the higher levels. It would be in the Boise office and that would be with typically the -- there's a position there that -- it's the large aircraft, I think, program coordinator. It was recently -- it was being run for the last many years by a woman named Charlotte Larson and she retired and they filled her position recently with a lady from here in Region 3 by the name of Kathy Allred. She'll be taking over in a couple of weeks up there, I understand. In addition to that, there's the national safety officer. And Tony Curran has been in that position and now I think Dr. Ron Hanks is the national safety officer. So that would kind of be the progression that we would use.

MR. : Has the industry met with those individuals in terms of trying to address this issue you've just -- been just discussed?

MATT ZYMEC: We're in constant dialogue with Tony Curran and I have not had any contact with Ron Hanks since he assumed that position, but -- and Kathy Allred hasn't taken her office yet, so -- I'm sure we will, though.

MR. : Can you give us an idea from an operator's perspective what sort of incentives the industry, you and your fellow companies, are given to ensure a safe operation?

MATT ZYMEC: Well, we -- in terms of the whole program in general of the flying --

MR. : To be blunt, everybody talks safety. I want to know what's done about it in terms of are they providing the money necessary to ensure a safe program? Are you having to --

MATT ZYMEC: We could always use more money. We could always use more for --

MR. : I guess, to be direct, do you have enough money in your contract to ensure the structural integrity of the airplanes you're flying?

MATT ZYMEC: I don't think so.

MR. : Do you have enough money for training?

MATT ZYMEC: No.

MR. : Okay.

MATT ZYMEC: And in addition to that, I have a contract right now that just ended about five days ago. That airplane and crew had been on the road since February 14. They'd been gone every single day since February 14. I would like to -- I have been -- there are other operators who do this as well. But I have gone around and periodically given those crews some relief, allowed them to go home see their wives and families and just take a break. But I'm only one person. I have six airplanes and we need some help. I would like to see some help, for me anyway, where I could actually have an additional full-time crew that just went around and relieved on a regular basis. I think that that could contribute a lot to safety. I know it sure contributes to their happiness and well being to some extent when I do go relieve them, and when they come back it's like they've just gone home and plugged into a battery charger. I mean, it's a whole new person.

MR. : Well, I don't know what direction all this is going to go in, and I don't know whether anyone's going to even pay attention to what the Blue Ribbon Panel says. But I do know that all we can do is come up with findings. And it's very clear, speaking to the contracting officer yesterday, that one of the problems it would appear could be addressed by the industry getting together and coming forward with the safety program as a group. That's an independent observation, not as a panel member but just as an interested observer we've heard from the industry come forward and people -- this is, I guess, the third company we've heard from and we welcome to hear from all of them. But the situation is certainly not rocket science. And when I spoke to the contracting officer yesterday I was disturbed because of his comment that, well, in the situation of the TCAS one company came forward with TCAS. But all the others didn't and so why should the government --

MR. : Exactly.

MR. : -- select TCAS? Well, I don't think that's the proper role for the government. I think the government has a responsibility to ensure the public safety and ensure there are adequate funds in the contract. But nevertheless, one of the ways to address that would be for the industry to come up with its own program to --

MATT ZYMEC (?): With respect to contracting, we have for about 20 years been in what they call a negotiated form of contracting. They will send you the solicitation, you'll review it, send them your initial proposal. And I don't care what you put down -- you could put down a negative number for your bid and they'll come

back and want you to lower it. No matter how well documented things that you have in there, they're always coming back and asking you to lower your bid.

I have received letters back from them that say my wages are exorbitant, my price is too high, my proposed maintenance -- or inspection program/maintenance program is excessive, that I have an approved inspection program by the FAA and that's really what they're looking for and that seems to be adequate in doing the job. We've received letters in those tones in the past. It's always followed at the bottom of the letter with a comment that says "If you are unable to lower your price, you will probably not be considered for any contracts in this go around." Well, now, my whole existence revolves around these airplanes going to work, and so does 30 people who work for me so I have an obligation to keep the doors open.

And when they put that kind of fear in you and you've seen them in the past take action that has taken every single air tanker company at one time or another and reduced them to a contract or two or none for a whole go around, I could not survive that. So we have to go in there and we have to reduce and cut and eventually we come up with the price and we've always had contracts. But when you go in with what you think is a well thought out plan that addresses some of the things that I think you're asking me about, there are always these negative comments. The TCAS could be a good example of that.

MR. : Well, there's a real question in my mind whether that should be the burden of the contractors or not. But in the real world we live in and the process that you're going to be going through in the next couple of years, that may be a burden you all want to assume. It should be the responsibility of the individuals that are responsible for safety, both in the Federal Aviation Administration who have the responsibility for these airworthiness certifications, as well as the Forest Service to be looking out after safety. That needs to be their number one job, not just in the written word but in the actual practice. So that's what we're trying to explore.

And TCAS is just -- is one example because when the gentleman that was -- testified wherever we were -- Salt Lake City, was it? I can't remember where we were. But nevertheless -- and mentioned TCAS and I asked the contracting officer, that was exactly what had happened. They had suggested TCAS, the rest of the bidders hadn't and the government unfortunately didn't see the wisdom or safety need for TCAS, which is unfortunate.

MR. : Would you be able to provide us with copies of any letters that are from the government agencies telling you your maintenance program was excessive?

MATT ZYMEC: Yeah, I'd be able to. It would be from years ago. If we still have the file on that round of negotiations.

MR. : Well, we're dealing with a culture that took years to build so it's -- anything that's old, we're glad to look at.

MATT ZYMEC: Well, I understand that, yeah.

MR. : I would have to ask has the industry collectively made an attempt through its own association, something like that, to essentially come up with a baseline where everybody agrees that this is what is necessary to run a safe operation? And basically you go in as a bloc and say, you know, "None of us are going below this threshold." Because it's the government's job in many ways to get the best price it can, but it appears there's no pushback.

MATT ZYMEC: We just had an industry association meeting in Chandler, Arizona, about 10 days ago and that very thing was discussed. We came out with a checklist of sorts, if you will, of areas that we felt we needed to address and have some unity on when we go to bid. And I think Bill Broadwell (ph), our executive director, is putting the finishing touches on that letter today. It should be in the mail today or tomorrow to Tony Curran's office, with some standardized procedures and so forth for our industry that we would like them to look at and accept, hopefully. So we are doing that right now. That's come up in the last couple of weeks.

MR. : Because, correct me if I'm wrong, but it appears there's only like nine people out there that provide this type of service?

MATT ZYMEC: That's probably about right.

MR. : And --

MATT ZYMEC: With the large airplanes.

MR. : Yeah.

MATT ZYMEC: Yeah.

MR. : And typically the government gives in the order of eight contracts, something like that?

MATT ZYMEC: Eight per operator you mean, or --

MR. : No, no, no. Industry wide. As I understand, there's only like one operator out there that didn't get a contract this year? Or maybe there's more, I don't know. In other words, the government's got to have somebody. It's the old question what if you offered a contract and nobody bid?

MATT ZYMEC: Well, I think all the large air tanker operators, I think everybody got contracts this year. Well, I know what you're referring to, okay. There was an operator last fall who was not awarded any contracts essentially, and then the government came back out with an additional offering for four addition contracts, which they bid and were awarded.

MR. : So the industry does have some leverage then?

MATT ZYMEC: That particular operator had a lot of leverage. He used a lot of legal clout. He's very well connected, and he individually was able to go and get

himself in a position where he was able to get a couple more contracts, four contracts. And then due to the severity of this fire season, they picked up the rest of his airplanes on what they would refer to as a severity contract basis. So for this past summer he was pretty much fully employed. But there was one operator who when the letters of intent to award initially came out about a year ago, he was not -- he didn't look like he was going to have anything.

MR. : Maybe I could --

MATT ZYMEC: And then of course there's -- we have another operator too who has been in the business for 35 or 40 years, 35 years, and he hasn't had a contract with the Forest Service for the last 15 years at least because they say his prices are too high, and he's a C-130 operator. That's my friend, Mr. Grantham, in the back of the room. Woody hasn't had a job in 15 or 18 years with the U.S. Forest Service because they say his prices are too high. He gets the same letters we get, that his wages are exorbitant and they won't deal with him. I'm sorry.

MR. : I was just wondering, Ben, from the engineering perspective, the restricted airworthiness certificates you get from the FAA, how appropriate do you see that as the kind of document that comes from the government agency responsible for the, for the safety --

(Audio break)

MR. : -- doesn't meet the requirements for like say transport category or whatever.

MR. : I understand that.

BEN WHITE: So they operate -- you know, as far as the level of safety, the level of safety is designed into that certificate for that aircraft when the conversion and the evaluation is made. In other words, there's a certificate plan that's created in conjunction by the application and the FAA. So you have a type certificate specification that you're going to try and fill, and then your job as the applicant is to demonstrate the safety of the combination. You must demonstrate it by analysis or test that is a safe airplane and its configuration and all configurations that it's planned to be operated in.

You can -- if you find a regime under which the aircraft is unsafe to operate, suppose, you can restrict, hence restricted categories and things like that, restrict the operation of the aircraft. In the instance of the C-54/DC-4, that's the only one I'm aware of that is certificated as a standard category aircraft. In other words, it meets transport category requirements. The certificate plan on that one was rigorous to the point where that aircraft is essentially the same as it was when they were in use as transport category airplanes.

MR. : But a C2 -- sorry, a P2V or an S2 or whatever that was designed for a mission profile which typically they're long range, few landings, quite different from the forest fire suppression role and the aircraft undergoes quite different stresses,

operates in different flight regimes. And I guess you're telling me that the discussions you have with the FAA when you want to bring that airplane into service account for that new role and profile, mission profile.

BEN WHITE: Exactly. Yes, precisely, that's exactly what you're trying to show when you're going to demonstrate that that airplane is safe to operate. If I were to put a caveat on that I would say that in the past, knowledge wasn't what it is today. If you go back 30, 40 years or 20, 30 years when some of these airplanes were tanked and when these certificate programs were developed, the requirements for demonstrating safety aren't what they are today, and we know more essentially. We know more about demonstrating safety, we know more about preserving the structural integrity of an aircraft today than we did 20, 30 years ago.

The level of safety of those aircraft was every bit as it could be when those certificate programs were developed. They were developed with good conscience, they were developed with conservative analysis. The applications were sound for what they knew.

MR. : They didn't instrument the aircraft? Or did they instrument the aircraft and test them, or was it all done on engineering analysis?

BEN WHITE: I'm not familiar with each and every certificate program out there, it was many of them done. Some aircraft were done by combination of analysis and tests. I'm familiar with what they did on C-54, and that was done basically through engineering analysis on paper and some testing, flight testing, to demonstrate the safety of the implementation. I'm not familiar exactly how they certified the rest of them out there, but I'm sure that there was some work done. The FAA is if nothing but consistent in those areas when they came to requirements of demonstration and safety.

With the new knowledge we have now, though, we can apply the damage tolerance technologies, and these will raise the level of safety as far as structural integrity is concerned in a fleet if it's implemented. What you're seeing out there in the world in the past two failures, the catastrophic failures that occurred last summer, have been attributed to fatigue. Fatigue is not a new subject, it's something we've dealt with in the engineering world for many, many years.

The difference and reason we don't see these failures in our transports flying around every day that are running much higher hours at higher stress levels, things like that, is we apply damage tolerance to these aircraft. We have inspection programs that are developed around fracture mechanics, and these inspection programs ensure the integrity of the aircraft.

MR. : For transport category aircraft, the airworthiness standard is basically the probability of a failure that will prevent the completion of flight and safe landing is not in excess of one in a billion. Is there a number for the restricted category aircraft?

BEN WHITE: Not that I'm aware of. When these military aircraft are designed for their missions, the military set the specifications for the durability of the aircraft as based on the knowledge that was available at the time. So if we're looking at an aircraft that was designed din the 1950s, their knowledge of fatigue and fracture mechanics was much less than it is today. Typical designs included things like safe life, where we could estimate how long it would take a particular component to fail under the stress levels that were typical of its profile. Safe life was a good estimate. It did not, however, take into account damage that would occur later in the history of the aircraft, or repairs. Damage tolerance does.

AL HYDE: Last round of questions for the panel.

MATT ZYMEC: I might also add too that I think the DC-4, the 6 and the 7, all the Douglas series airplanes are transport category airplanes, and most of the ones that are flying, if not all of them today, still have a transport category airworthiness certificate with them, even though they're tanked, that they've met the requirements of the transport category certification.

BILL SCOTT (?): But I guess there's still a question as to what the inspection interval and the level of inspection should be, even on those aircraft, to ensure structural integrity --

MATT ZYMEC: Well, we feel that -- I know that we're running out of time here, but quite frankly with the Douglas airplanes I think it applies to the whole series, even though I only operate the DC-4. I think we're actually quite comfortable with the inspection intervals that we already have, based on the case histories on those individual airplanes and the problems with the structure. However, given what we know -- the information that we know now is more than we knew three months ago or four months ago, and we are looking into ways ourselves to enhance our own programs because we'd be foolish not to at this point. I mean, it won't hurt anything, that's for sure, but it will cost some additional money to look at.

BEN WHITE: I'd like to add, Bill, that years ago Douglas aircraft was asked by the FAA to develop supplemental inspection documents for their aircraft, and they used damage tolerance to come up with supplemental inspection documents on the DC-9, DC-10, DC-8 series aircraft. They went with and looked at the DC-4s and DC-6s and 7s, they used service history on those aircraft. They developed a supplemental inspection document for the DC-6 but they chose not to on the DC-4, and one of the reasons was because they didn't see a service history of problems in that aircraft that they felt they needed to do it. Now, that doesn't mean that the specific profiles we run today with the tanker aircraft wouldn't benefit the aircraft by applying this technology.

BILL SCOTT (?): There's still a level of unknown because they're not characterized the environment they're operating in, is that correct?

MATT ZYMEC: That's correct. Stress levels and environment.

MR. : Matt, do you operate here out of Albuquerque?

MATT ZYMEC: I am based in Kingman, Arizona, is where my home office is.

MR. : Okay.

MATT ZYMEC: We've flown out of Albuquerque once, of course.

MR. : Sure. Did you indicate that you operate three of the CL-215s?

MATT ZYMEC: I do.

MR. : Okay. And where do you use those?

MATT ZYMEC: In Minnesota, Canada. The state of Minnesota purchased two of them and they put out a contract crew and maintain a turnkey operation. And I was the successful bidder on that project two years ago. We have a five-year contract with them. And then we lease a third airplane directly from Canadair, Bombardier now, that we contract with the U.S. Forest Service and the state of Minnesota on a call-when-needed basis. And it is also in Minnesota too.

MR. : Okay. You're familiar then with North Carolina?

MATT ZYMEC: I am.

MR. : Right. Who operates that one?

MATT ZYMEC: The state operates that themselves. They crew it and maintain it themselves.

MR. : But under the present contract it would be impossible for you to use that plane under the federal contracts?

MATT ZYMEC: Under the national contracts right now there are no provisions for us to be able to fly for the Forest Service. We have a local -- you're probably aware that the Forest Service is divided into regions here in the United States, one through nine or 10, whatever it is. The Great Lake states are in region 9 and we have a local regional contract for call-when-needed services with the U.S. Forest Service. But that does not permit us to take the airplane on that contract to Southern California, to Washington, to Oregon or to wherever else there might be adequate water for us to work, North Carolina, Florida. That contract is only for that region, it's not a national contract.

AL HYDE: Any other questions? I think we'll break here, thanks very much.

MATT ZYMEC: Thank you.

BEN WHITE: Thank you.

(Audio break)

LANCE GRACE (ph): -- inside person in this business. Hopefully we'll figure whether I'm articulate or not, but I'm on the outside of this business. My wife of 25 years ago, today, by the way, told me --

MR. : Congratulations.

LANCE GRACE: She told me I shouldn't start with this story, but I think I will, because this is the first briefing I've been at in the last 10 years where I feel the same way. I was running flight test programs down on White Sands Missile Range about 10 years ago and we weren't getting the support from the range that we needed, so I went out and bought my own TM antenna, telemetry antenna. And two weeks after starting the operation of it, I was called down to the range and I walked into a room where there 22 people were sitting there and they all hated me.

And about an hour, an hour and a half from the meeting they knocked it off and said, we're going to have to -- we're going to go back and come back with you on proposals two weeks from now. And so anyway, the result of that, even though there were 22 guys there who thought their livelihood was in jeopardy because we were the biggest -- I was the biggest user of the range then, over the next 10 years those two programs I was involved with funneled probably about $200 million through that same group of guys in that room. So hopefully that's for -- I don't have a flack jacket on here. And because my discussion today is going to be about an A-10.

My name is -- I'm going to introduce myself in a second, really. I'm Lance Grace. I live down in Alamogordo, New Mexico, and it's about three hours south of here. And I have a list of goals right there for what I want to talk to you about today, or it's not today, these are very long, lofty goals. But the first one is a little checkmark right there with little dotted lines. I mean, it's just partially filled in. And that says, "See the day when the Forest Service commits to making a valid assessment of the A-10 for conversion to an air tanker." This is not a new issue, it's been around for about 10 or 15 years actually.

MR. : I'm not familiar with the history.

LANCE GRACE: Well, the first history starts in the late '80s actually with the Forest Service, who had arranged to get two airplanes to go through a test program. All the details of that actually I believe Dick Foy (ph), who's with Aero Union or whatever, I haven't talked to him for years, could probably give you all the details on it. But the program never went on.

In the early '90s when it looked like all the A-10s were going to be retired from the Air Force -- well, in the late '80s when it looked like they were all going to be retired, they weren't after Desert Storm, they were retained in the Air Force, and right now they're going to be around for probably another 15 years at least. Well, if they're looking at 15 years now, it will probably be another 20 or 25 or 50 or anything. A number of people have proposed this. In my mind if you know the term,

what part of no do you not understand, I've never seen a valid reason for turning down this program like this.

MR. : How was it even considered? That's what I'm trying to figure out.

LANCE GRACE: Let's jump to two slides and I'll tell you. Then we'll go through who I am. Let's forget about the A-10, let's talk about an airplane that you're going to build for initial attack. I have 20 things right here. There's nothing magical about them, I just wrote them down. And if I was going to start the design of an aircraft I'd believe those things would be very important issues. There's probably more. I'll just read them real quick.

As I said, short field (ph) cable, rough field cable, large payload, high top speed, low stall speed, high agility, high G-load capability, tolerance to turbulence, quick turn capable, simple systems, two engines -- I'll talk more about that later -- a single pilot, bubble canopy, easy to fly, precision delivery, munitions hard points (ph), low maintenance costs, low operational costs. You start someplace, there's a list of your desires. I'm sure there's some more if you start designing an airplane like that.

Eclipse Aviation's across the river right here, about 10 miles away from here. They're spending about $250 million in their development costs on the Eclipse, and $250 million is cheap, that's because they're a private company. If it was a government program it would be a lot more expensive than that, I assure you. The flyaway costs, we just heard today that the CL-415 is $23 million, so you're talking probably about a $20 million airplane.

On the bottom line, the whole thing is not going to do it. Just simply not going to design a new airplane for this role, so you have to rely on something that's out there. And I think, again, to me I think of a term intuitively obvious to the most casual observer. If you're a casual observer in the aviation world and think about what kind of airplane could possibly do this, you'd come up with the A-10. And that's what wing fighters -- no other fighter in the world is similar to this airplane.

The only -- the one example, one somewhat similar airplane is a thing called a Su-25 Frogfoot and it's a Russian aircraft and it's essentially very similar to the aircraft that completed against this, which was the A-9, built by Northrop. The A-9 and the A-10 went through competition in the '70s for this, and basically the Russians picked the A-9 and built their own, and we built the A-10.

The only difference is the A-10 basically is a pig, that's why it's called a warthog I guess, but it doesn't have high thrust engines. There are things that you can do to those engines, though, give it -- dramatically improve its performance. Because it's military aircraft, there's all kinds of avionics and defensive systems on that plane that you don't need. In reality there's lots of other stuff on that airplane from nuke hardening and chemical and biological warfare issues and everything else that you don't need on the plane either.

You don't need a gun, I don't think. So you don't need that big, old 30 mm gun, and because of it you built the plane right and put the nose gear on the centerline. The two tails were put in that airplane for infrared suppression to give it a better survivability against the SAMs. And the last thing, it's ugly. And unless you're British, if you designed an airplane you'd make it look good.

So why is the A-10 the unique airplane? I kind of look like -- I kind of look at the A-10 as the most advanced World War II fighter ever built, but it was built about 30 years after World War II. And it was built to move mud. It was built specifically for the CAS mentioned, and CAS is close air support. And close air support, to just read this definition right here, comes from an Air Force manual and said, quote, "Attacking the front line of maneuvering enemy forces while in close proximity with friendly troops." I think the real important issues is maneuvering forces, they're on the move, just like a fire. And friendly troops, just like the friendly firefighters down below.

And this plane is designed to take on the guys on the front line, not like -- actually unlike any other airplane. There are munitions that can do that job nowadays but no other airplanes like that. Now, if you were going to compare a wartime mission with a peacetime mission or vice versa, you would find out -- you would come up with the fact that aerial firefighting is almost identical to CAS. The exception is that generally nobody's shooting from you on the ground. That might not always be the case I guess.

You guys, I looked at your charter in the letter that Al sent me. Said as you look in these five issues right here. You know, I could talk about this, I could talk about a bazillion other things, but here's the five issues you guys were looking at. The first one is safety, operational effectiveness, cost, sustainability and strategic guidance. By the way, I have no idea what strategic guidance is but I'll give you my opinion anyway.

The safety. Bill Scott mentioned earlier I have something about flight safety is that there's always a flight safety office and there's a flight safety empire, when in reality flight safety should be in every single operator and every single mechanic associated with those airplanes. And it's something that just has to be inherent in every single thing that you do when you're in aviation. And in fact, I think it's something that in a proper organization should be in all organizations.

So when we go through this, I want you to think about a technician in a lab or a mechanic in a Chevy dealer or a nurse at a hospital. You have three basic things, you have equipment, you have the operator and you have the procedures that the operator uses to operate that equipment. And the first thing is you use the right tool for the right job, we've all heard that since we were little kids. And it's just super critical. And the next thing, whatever that tool is, you've got to keep it properly maintained. Lots of reasons for that, not just safety. Well, safety is inherently part of proper business practices, so you have to keep the tool maintained, whatever that takes.

The operator, you have to get the people who have the proper experience and credentials initially. Once you hire them, you have to train them properly, and then once you train them properly you have to maintain their currencies and maintain their training and upgrade them as new systems and new techniques come into play. And not flying still, I'm talking about mechanics in a Chevy dealership. Same thing. When a new carburetor comes out they've got to learn about it. They got to learn that the old way of doing gaskets might be archaic now so you use this new silicone gasket, whatever it happens to be.

The last thing is the procedures. Unless you're in the development business, you probably ought to use procedures that have been already developed and certified by whoever that industry standard is. You know, and we have -- depending on the industry, there's all kinds of different organizations who devise those standards, and there is one for every industry. And then once those standards are there, somebody in that organization has to be updating them on a regular basis. The ones that applied 10 years ago don't apply anymore today for a number of different reasons.

So I can go through that whole thing with A-10s where I think the A-10 satisfies a whole lot of the safety things. And I'm kind of -- I think I'll go through the rest of my briefing. Maybe you can ask me what that would be.

The next thing I want to get into is both operational effectiveness and cost. Put those -- lump them together in one, in reality it's three, because you missed one. Because if you're doing a project there's three things, there's cost, schedule and performance. And Matt talked earlier about the contracting. Is it insider? I see this from government contracts I'm involved with all the time who are looking for the lowest bidder, and it's absolutely asinine to do things that way. Because in reality, what you're looking for is best value. And best value is a combination of cost, schedule, performance.

There's a little formula right there, the higher the performance, the higher the value. The higher -- well, schedule, I've kind of played around with schedule a little bit. Obviously the lower the cost, the greater value you get out of it. For scheduling, what I've looked at in this particular role was kind of a combination of the availability of the aircraft, these are time related elements. The availability of the aircraft is a -- the high availability -- good thing. And the time to do the job, the faster it is, is a good thing. The less time involved is a good thing.

So if you look at that, I just want to do a comparison right here and I'm not picking out C-130 or anything, but I'm just going to compare C-130 to an A-10 real quick in just a few elements, just a handful of elements. Obviously big plane, little plane, both good planes for the roles that they were designed for. C-130, four Allison turboprops, the A-10 has a couple of GE turbofans. The bottom line is it's not my opinion -- it happens to be my opinion, but it happens to be the fact of aviation that if you want a plane to be cost effective you built it with two engines. That's why there's 777, that's why 767, 737, et cetera.

You don't want any more than two because the more engines you have, the availability rate goes down, because, I know it sounds weird, but they're going to

break -- there's a certain break rate on each engine and you multiply it by four and you get -- your availability goes down. So you want two. You don't go less than two because you want that for the redundancy in flight. And that's the way aviation's going. You'll see on the Sonic Cruiser being designed by Boeing the same way. It will be all the -- there are some exceptions to that, but you will see that on generally the vast majority of future planes.

The next thing, some airspeed differences, I think that's obvious. Retardant, 30,000 pounds and 115,000 and other, a major issue but that's just one of a whole bunch of different things. The last one right there I said three man aircrew, the other one's got one. Just in that, which is the better plane? You don't have enough information, you just don't. But there's four of many elements right there that go together to figure out what really does have the best value.

I came up with all kinds of things but we could sit in a room and everyone would come up with some more or less, whatever. But when you get into performance, I think it's basically how much can you carry? How much of that, what you're carrying, can you get on the target? And then what is the -- how is that spread on the target, the pattern, is it uniform, et cetera?

For the mission times, how fast do you react when you get called? How fast does it take for you to get out of the chocks. Ground time, how much is it -- how much time does it take between a ground take off, take off and back in the chocks? The crew speed is fairly obvious, and how long does it take it to make a delivery, to drop your load. I can talk about that probably way too much, but the bottom line is that fighter and attack can do everything, both in the air and on the ground faster than anything else. It's way more than just speed, it's the agility. And then the last thing on that, I said how fast can you turn the airplane afterwards, refuel it and reload it?

Availability? What I call a mission is how -- out of 24 hours in a day, how many of those can you perform your mission? You know, that's a combination of weather, turbulence, light, dark and everything else. So how often can you do that mission in a day? The availability of the aircraft and the availability of the crew I think are obvious.

The cost, acquisition cost, yeah, you can buy planes, but if you're going to get a plane out of the boneyard there's major expense there too. By the way, there are tricks to that. There's cheap ways of getting them out, I've got planes out of the boneyard before, but there's expensive ways too. Spare parts, the plane that you're taking care off, is it unique, are there more flying in the world, are there -- is it a military airplane where there's a commercial equivalent or not? So all issues with cost. Maintenance operations and fuel are all obvious.

The sustainability was another issue that you guys were looking at. The A-10 right now, the plane was built -- it was designed and tested in the '70s. And although I think it came out -- first one flew in the late '70s, somewhere around that, and I guess we had to call that a modern airplane. But they were supposed to have been gone by now, replaced with faster airplanes with better munitions. They have been

retained, they're going to be around to 2015. You can correct me on that number but that's the last thing I saw.

They're going to be replaced with the JSF, which is the X-35 Joint Strike Fighter. We'll see how long that really takes for that plane to come on out. But eventually in the end, if you had a fleet of A-10s you will probably have approximately 500 airframes to can from during the years, and that's without building any new parts. As far as the engines go, engines are always a critical factor in aircraft, totally separate issue than the airframe itself. But a very unique thing with the A-10 as far as the Warbirds go is that there is a commercial equivalent engine in use on the Canadair Challenger. In fact, the commercial engine has a better hot section and drastically increased thrust.

MR. : Which engine is that?

LANCE GRACE: It's the TF34.

So very unique. I happen to fly a force of J79s. It's going to be real difficult to find a commercial version of a J79. This plane is unique in every way I can possibly think of, and that's why it just jumps out as a plane that should be honestly looked at in this role.

Right now -- well, I can't say right now, but as of a few years ago there were 173 of these airplanes in the boneyard. Just real roughly, probably about half of those airplanes are what you would call good ones. They were retired because of budgeting, not because they were bad. They were supposed to have been upgraded but they were at the end of the upgrade list and I think they cut it back from like 500 to 400 in the upgrade. So about half of those airplanes in there are good airframes. The other half are your ones who were involved with various accidents or, you know, just broke here or there, whatever.

Strategic guidance. Again, I didn't want to approach this one now --

MR. : We're going to do this, and then we'll do five minutes of questions and then I still want you to hang around --

LANCE GRACE: Okay. Major difference from the A-10. A-10 is a war bird, there are some rules involved with that, and the rule is if you want to buy one of these that's fine, but it's going to come to you in ingots, or beer cans or chopped up parts and pieces you won't be able to use. So the bottom line is a war bird has to -- can't be sold. They can always change laws, but I highly doubt that will ever be sold. However, there are two other ways to operate war birds. One of them is GFE -- which is Government Furnished Equipment -- there is a reg, an Air Force reg, that's specifically for operating your craft this way, and it's called Air Force Reg 55-22.

I happen to have been a GFR, I forgot to talk about my background, but I was a GFR -- Government Flight Rep -- for about, I think about seven kinds of fighters. A couple of them I flew, the other ones contractors flew, but they were all Air Force owned fighters.

MR. : Excuse me Lance, this is what's called bailing?

LANCE GRACE: Yes. The other way is leasing the aircraft. That comes under a reg that's actually called Air Force Instruction -- that's 64-103 -- and it's actually where you lease a government aircraft. The planes I happen to fly right now are four F4Ds that are leased from the Air Force, they're operated by BAE systems, which was formerly Marconi, formerly Traycorp (ph), formerly Flight Systems -- which Bill Scott worked for 15 years ago or whatever.

There's three pilots and there's four F4s, and in fact I'm going to go fly one, two days from now, out at Mojave. There are ways of doing this, is the bottom line. But you can't own these airplanes. And I know there are major concerns from the business perspective about the fact that if you don't own the airplane, you don't have collateral, et cetera, et cetera, there are major business concerns, and there are some people at the back of the room here who can talk to you in detail about that.

If you're going to get in to this, I would highly suggest -- and earlier you were talking about safety and training and how you really operate these kind of airplanes -- you need to have some kind of other organization, that, I would suggest that a contract or government organization -- I personally advocate contractor -- that oversees the training and the maintenance of all this -- that doesn't perform that, that job -- the individual contractors would do all the maintenance. According to both FAA and United States Air Force rules, the F4s I fly fall under both those, both those sets of maintenance and operations.

Another area that I think that ought to be done or whatever happens is that I think there should be a closer coordination between different government agencies. These aircraft, specifically A-10s, a lot of people have experience operating them and a lot of people have experience maintaining them, and it shouldn't be a mystery of how to do that from a contractor. There should be an open dialogue between those agencies and I don't think that's done at all right now. And then the last thing is just my little thing with lead planes, you don't need lead planes with A-10s, they're not required, and more than that, you don't want them, they're in the way.

You would need somebody up in the air coordinating the operation, but no lead planes, that's a technique that went out of vogue many, many decades ago. So that's my -- I gave you a couple of pictures just to look at an A-10 there. That's my basic presentation. I have a bazillion numbers associated with this, capabilities et cetera of A-10s, and that's something that I can pass on or whatever.

MR. : Lance, I need to know something about how you would carry the retardant.

LANCE GRACE: All the retardant on all the aircraft right now are all carried internally. On all the planes, on all the air tankers. Fighters, flash attack aircraft were designed with hard points, you carry stuff externally. There have been very few exceptions, and only one successful one ever. There were a couple of interceptors that had internal carriage, 102, 106. But the other ones were 105 and the F-111 had

bomb bays, they did carry nukes in them, but the 105 ended up putting fuel in there and extending the center line and carrying the weapons externally.

There are loads of -- there are a whole bunch of different reasons why you want to carry this stuff outside, it's not part of the aircraft. And this, it makes the modification way easier, because you're not screwing around with the airframe, you're doing the stuff with external stores. The only successful plane, for a totally different reason, is the F-117, fighter-wise, fighter attack. The 117, that's done internally only because of stealth, not because -- they lose lots of performance and everything else because of that.

So you want it externally, my proposal would be -- in fact there's a picture I gave you right there, it shows a couple of 500 gallon tanks, fuel tanks on the plane. I would go with three 500 gallon tanks, loaded on those three center stations between the gear, gives you good handling qualities if you have any problems at all.

MR. : And these would be gated obviously, you can dump them separately, and things like that?

LANCE GRACE: Yes. Yes they would be gated, I can talk about how I would do that a lot, about whether you come out the bottom of the rear et cetera, but that's more the technical aspects of this, and that's something that would have to be determined during real development and testing.

MR. : Al's getting his crook out, so if I could just summarize. Here you have an airplane that you think would do the job, and it's designed to work in the kind of environment that fire fighting's all about. The same level of turbulence, everything. And knowing what I know about the A-10, it was designed to stay in close, work down low and make accurate deliveries, is that right?

LANCE GRACE: That's right. Absolutely. To introduce myself -- I never got around to that, because we skipped that -- here's what I really do. I retired from the Air Force seven years ago, I was a fighter pilot for 10 years, I was a test pilot for 10 years in the Air Force, I'm a part owner of a small engineering firm now, and what we specialize is multi-spectral suppression, which is stealth. We do modifications to legacy systems, old things, we also design new things. We are the team that won potentially the largest defense contract ever, and in fact the largest federal government contract ever, and we're the team does all the stealth and all the topside integration on the series of future service combatants for the Navy.

So these are stealthy cruisers, destroyers and Arturo (ph) combat ships. I also fly on the side, because I've still got to laugh and smile, so I fly for BAE systems and F4Ds, and we support a variety of military programs.

MR. : And what is your interest in promoting this aircraft, that's what I'm trying to understand --

LANCE GRACE: You know, sometimes I really wonder about that --

MR. : I mean, there are always rewards for good citizenship, but I didn't know why you're here today.

LANCE GRACE: You know, when I got up this morning at 3:30 I was really kind of wondering about that. It's not for money, how's that? Because there's a lot of other ways --

MR. : Sounds like you're successful already, so I was just trying to understand --

LANCE GRACE: We're doing very well. This is something I got -- honestly, the U.S. government's spent an incredible amount of money on me. I have specialized training, I went to test pilot school, I'm one of the very unique guys from the Air Force, because I was a test pilot and I was very highly experienced when I left the Air Force. I just felt that I could apply my knowledge and experience to something else that would be --

MR. : Since the Forest Service is having difficulty getting the Department of Defense to even consider giving older aircraft, why do you think that the Air Force might consider an aircraft that's still in service?

LANCE GRACE: Well, you said giving, that's one of the things I just talked about. Because one of the things --

MR. : Well, transferring, whatever I mean, although the Department of Defense doesn't understand it occasionally, we do pay our taxes and they are part of the government, and so I when I say "give", I mean, it's all the U.S. government and we have all paid for it.

LANCE GRACE: Right. Well, I'm sure that you know what happened 10 years ago, there's a lot of people in this room that are very familiar with the trade that went on that last time --

MR. : Well, regardless of the structure, what would be the motivation for the Air Force to do this, since they might need this aircraft for --

(Cross talk.)

LANCE GRACE: I don't think there is --

MR. : -- Let me interject here, Jim. Because I went through a lot of the same things that he did, getting those F4s from the Air Force in to the hands of what is now BAE systems. I mean, I wrote the proposal for that. And there is a law ruling regulation that says if you can show a benefit to the government, the government is willing to bail or lease these aircraft for private operations, but it has to be for the benefit of the nation.

LANCE GRACE: That's an excellent point, because if you --

(Cross talk.)

LANCE GRACE: -- ought to get this reg and instruction and read it because they say that specifically. You do not have to have any benefit for the Air Force.

AL HYDE: -- We're not done at this point. We have another presentation (inaudible). Thank you, Lance.

ED HERLICH (ph): My name is Ed Herlich, and purely by coincidence, Lance and I started thinking about this independently, roughly the same time in about '93. We are not affiliated, I met him for the first time this morning. Especially you folks in the back room that I'm very uncomfortable with my back to you, because frankly, you're why we're here. And the proposal I have --

MR. : -- Well just take the microphone out and talk that way. That's fine with the panel.

ED HERLICH: (Off mike.) I brought along some material also for you guys also to (inaudible.) This actually is not an A-10 proposal. This is a proposal on more like the whole system, and I'll run through the outline in hopefully about four minutes, then you can ask away. Let's see, what we have proposed -- we being just a small group of folks who have started out with pretty much the same thought process that you've already heard -- the A-10s were theoretically being retired at the time, and just for the record, there are at this moment 190 A-10s in storage, another about 30 pushed off on the side of various ramps around the airports not being used, there are a few less than 400 still flying with the military. They will be around until 2028, and I actually think a few years longer than that.

So they'll be around for a long time. The reason there are so many extras -- just to get that out of the way -- is back in the late '60s, the New York Congressional Delegation forced the Air Force to buy 200 more A-10s than they wanted, because they were built on Long Island. That's why there are so many in storage right now. The Air Force was forced to buy more than they wanted.

MR. : Are they still making parts for them?

ED HERLICH: Sub-system parts, yes, airframe parts, no.

MR. : So the Long Island installation has closed down?

ED HERLICH: Well, actually the ownership of the A-10 itself has changed twice. It's now in Northrop Grumman, I believe. So what is a proposal that it really should be? We believe three classes of air tankers. You can see that there are heavy heli tankers, you know, something around 2000 gallons. Something specialized for initial attack, for pretty much all the reasons Lance listed, and then something much heavier. Sir, Mr. Johnson, that picture in your hand is 186 A-10s out in storage. It's just a better representation of what you've got in your package there. And then something very heavy, the heaviest, most accurate delivery platform you can come up with.

Also going through a similar process to the one Lance described, we believe that should be the P3-B for a few of the reasons that are in there. Obviously it would take a decade to transition between all of these things, so it's nothing that would happen immediately. If you do that you can then also change the operations a bit, to something we call red flag patrol. It's done in Europe in some places for example, where if the conditions are bad enough, red flag days, you would put some number of your initial attack air tankers on patrol. The details of the A-10 proposal even go in to an optional ultraviolet detection system. The best one I've seen is built in Israel.

They told me four years ago it could spot a 10 square meter of fire at 10 kilometers, and it would not false alarm. You can tune it for the frequency of the fuel, so you can put an airplane up there that is constantly surveilling roughly 100,000 square kilometers all the time. And then, the system that finds the fire has the means to deal with it. You know, of course, as the word goes out and everything else for initial attack shows up, because obviously air tankers are one of the tools in initial attack, nothing will ever replace the guys on the ground. No way.

If you do that, you can then also share that technology with the other aircraft, you can put in infrared systems if you choose to, computerized bombing systems, non-gated -- as in pressurized, retardant delivery systems, not doors. Doors will not work on the A-10. You can also then use at least the initial air tankers for something else. For example, they have a Homeland security role since arson is a huge big deal. They could do search and rescue sort of missions. They can do disaster recovery, where you can reconnect communications systems, basically operate like a low flying satellite if you wanted to. There's obviously some detail on that. We believe the A-10s -- and again I'll start specializing now on the A-10 --

MR. : Have you talked to the office at Homeland security about this yet?

ED HERLICH: I can't go in to that in detail, because actually in my Reserve life I do those things.

MR. : Hmm?

ED HERLICH: In my Air Force Reserve life, I do similar things.

MR. : Oh okay.

ED HERLICH: So, yes, I have. They would actually use them for something else besides fire fighting. The point is, that there is more uses for these airplanes -- they would be busy all year long -- that gives you economies of scale. For example, if you were to convert these things, have other players pay for parts of them. The test A-10s, and our proposal is only to test two of them and nothing else until you see if it works. The test A-10s could be in the air six months from delivery to a conversion facility. For the record, we have no stake in converting these aircraft. That actually is much more Lance's expertise than ours.

They should be tested for one full fire season, two parts of two seasons, one season, whatever it takes to figure out if these things really work, and then do it right for the rest of the conversion, if that's called for. As far as where -- a year ago June, the state of Colorado wrote to the Forest Service, and you guys will be used to this response, they got absolutely nothing. Not even an acknowledgement that the letter had arrived, because Colorado said we want you to reevaluate the A-10. And in the conversations that went around that, they said and we will do it. The state of Colorado volunteered to host the tests for the A-10 --

MR. : Who sent the letter from Colorado and who was it sent to?

ED HERLICH: It was sent from the senior aviation guy in Colorado to the senior aviation guy in the Forest Service.

MR. : Who's that?

ED HERLICH: At the time, it was Tony Kern's predecessor, actually, and -- we asked that question this morning -- I'm drawing a blank on his name.

MR. : Paul Barton.

ED HERLICH: Thank you. And when Tony took over, he didn't even know a letter had existed --

MR. : Now it wasn't from the State Forester of Colorado?

ED HERLICH: No, it was the senior aviation guy, Rich Holman (ph), I believe. Is that right? Okay. Yeah, Rich wrote the letter. Now, obviously the Forest Service was fully involved in that, it was just Rich's job, since he was the senior guy involved with aviation. That was a year ago, June. In fact, on the website, the informational website we maintain -- which is just firehogs.com -- there's a button for letters, and you'll find that letter on there. You'll also find letters from back before the air tanker fraud, where the Air Force wrote to the Forest Service and said okay, how many A-10s do you want and what do you plan to do with them, and the Forest Service wrote back and said we're going to do this, that and the other.

So the Air Force cooperated until they got on 60 Minutes, basically. And, you know, with any bureaucracy, they don't like that very much.

MR. : And what was on 60 Minutes?

ED HERLICH: There was even speculation that the Forest Service wanted A-10s to send them down to Nicaragua and kill Contras at the time. But most of the piece on 60 Minutes had to do with transferring the C-130s, and who was flying them, and stripping them for parts and all that stuff. It was that story. And that dragged the A-10 -- sorry, the Air Force into the limelight for aircraft transfers, and the A-10 just got caught up in that as a coincidence. So where -- the why.

That picture you see under why explains a big part of our motivation, that's the home in Carlsbad that burned. My sisters and her families watched that fire from seven miles south, one of my partners and his family watched it from nine miles north, I just watched the Hamen fire from my back deck, I have property in Black Forest, Colorado near Monument that will burn. It absolutely will burn some day. It has burned in the past, and it's way overdue.

MR. : Don't say that. I live there.

ED HERLICH: I know that. Just, you know, along Higby Road (ph) and that ridgeline right there, it's going to happen. And finally the how, for aircraft acquisition. I guess that there are roughly 220 what we call retired or extra A-10s out there. You can not say excess, you can not say storage, those two terms have formal, legal definitions within the government, and because, as Lance explained, these things cannot be privately owned, they will never be excess and they will not be transferred under the ordinary non-munitions list programs. These planes are lethal. They will not be transferred.

You can see in the pictures there that there are a whole bunch of them out there. You can see one wrapped up. As of last count, which was last Wednesday, of the 190 in storage, 70 were in what's called inviolate storage, which means they must be flyable. The definition says that they have to be able to fly away in five days. Of those 70, the Air Force announced three years ago they needed 60 of them to keep the entire fleet healthy through to 2028.

Now, since then, they have actually reduced the number, so it is something less than 60. I can't go in to that in this forum, you can ask me at the break if you'd like on the details on that. The point is, that the Air Force has already formally announced how many they don't need, which is almost everything in that picture you've got right there. On the P3s, as of Wednesday, there were 124 of those in storage. We advocate the P3 Bravo. The P3 Charlies are too valuable, they are being used for foreign military sales, but the late model Bravos have same, more powerful engine, they'd do quite well in the heavy air tanker role. For the conversion, I mean Lance went through all that kind of stuff.

We disagree a bit on how the tank would work, and you can see photos of it going by. We would use one large tank. Those three belly stations on the A-10 were designed to carry 15,000 pounds at five Gs. So the plane is hugely strong. Even the Forest Service has said that it will carry 2,000 gallons of retardant. The Forest Service has, by the way, evaluated this just a little bit, in the '96 study that came out, where they said this is the most agile, most accurate, fastest plane they've ever considered. And then they stopped considering it at that point. Just wrote it off, and pressed on in to other airplanes. Never really finished that sentence.

The P3 of course could be converted, just like they always have, except that we would not hang a blister on the outside. That blister reduces the P3's top speed by about 130 knots. So if you put the retardant on the inside, coming out through a pressurized system, pretty much the way you see it hanging on that model of the A-10, the P3 could potentially dash at 400 knots if it absolutely had to, which means it

cruises around all day at 300. Performance, you can see the list there, 350 knots cruise loaded, faster when it's empty. Fully aerobatic, even in drop conditions, which would be at about 200 knots. You get 200 knots over the wings, which is still aerobatic for the A-10.

The retardant would see about 120 knots of wind, because it's being propelled backwards, out of that tube you see in the bottom of the tank. Again, not drop doors. That also does much better things for the retardant. It would come out -- you wouldn't have it vaporize. If you look at photos of a drop through doors, for example, you see a big plume of vapor coming off the back of the load. If the droplets get too small, they drift down softly and just coat the top of the fuel, don't do any good. That's actually a bottom line problem with the MAFS system. It atomizes the fuel or the retardant, so it is too light. A pressurized system propelling against the direction of flight would help with that. We think both the P3 and the A-10 should have that.

And you can see the P3 -- I think the conservative estimate on the load on that is 3,500 gallons, again because it's carried internally in the strong part of the airplane, not externally on a blister. For operations, like we said, it has to be government owned, they absolutely should be contract flown. I mean, here's the experts right behind us.

The heli-tankers and heavy air tankers should be flown the same way they are today, essentially. The only real difference in the operation would be that option for airborne alert or airborne patrol, you know, that red flag stuff. And again, that's where the sensors -- which could go on A-10s, P3s, anything you want -- would be very valuable. The infrared suggestion for the A-10 is to put a stereo infrared system on it, project that in to the pilot's visor. The Air Force has purchased 6,000 helmets like that already. That would not work as well in an airplane that has either side-by-side seating or an enclosed cockpit.

You know, centerline seating, bubble canopy is where that's designed to work, because you have to look around in all directions. But some version of that like a head up display would, say, work in the P3. Or you could get some benefit out of that technology even if you can't look through the floor off to your right side, for example.

And finally, on the last of your panel focus areas -- safety. Nothing has ever penetrated the cockpit of an A-10. Nothing, ever, no matter what. They've had A-10s hit trees, cut the trees down, pilot flew away a short distance and ejected. They've had A-10s cut down high tension lines -- those 250,000 volt things -- cut those down and fly away.

So it's far and away the safest airplane, the most rugged thing out there. And we would insist on retaining the ejection seat because you're going to lose airplanes. No matter what, you will lose airplanes. And we see no need to lose pilots. For operational effectiveness, Lance went through a lot of that. The P3 we also think is very good, very fast, rugged, certainly as good as anything we're flying. Costs, the A-10 one-third of a C-130 to own -- I'm sorry, one-10th of a C-130 to own every year. The bean counters at the Pentagon have a website that lists the expenses on all their airplanes -- and you guys would be really interested in this one -- where the

oldest C-130 they had was the B model. If you look at the annual expenses, the A-10 was right at one-10th the annual expense to own, with the routine maintenance and parts and those sorts of things.

In that same website, it said the military versions cost about $1,700 an hour to fly, which included all the weapons. You're firing $25,000 missiles, for example. And that's factored in to those costs. So the A-10 is very cheap to own. Now, the hourly operating costs would be, without profit, at around $1,700 an hour, as best we can tell. Now again, these are military numbers because the Forest Service has not looked into it in a practical sense. And sustainability, as Lance pointed out, there are hundreds of them out there. In 2028 the Air Force will retire the last 144, the last two wings. So between now and 2028 they will retire more A-10s. They will bring some out of the boneyard as basically crash replacements, but as they replace the ones that are on active duty, they will have a less and less need for the ones that are in storage.

So they are very sustainable, and the P3 again with about 100 excess aircraft airframes in the boneyard, is also very sustainable for the same reasons. A little over four minutes, sorry. Can the guys in the back ask questions? So, how can I fill it in?

MR. : Is it likely that DoD would turn loose these under a veil operation? What's your feel there --

ED HERLICH: It is unlikely that DoD will ever cooperate. They are actually in contempt of Congress right now over the C-130s. So the reason you exist -- this panel exists is pretty much the bottom line for whether any of this will work. We finally had a fire season that was so brutal with such huge losses among the community back here, that we hope that there's enough political will now to make that work because that's all it takes. It's pure politics. This stuff about no aircraft, no A-10s being available, whatever, is complete nonsense and always has been.

The Navy for example got over that fraud problem and has transferred aircraft since, let's call it '91. The Air Force hasn't transferred a single thing. They won't transfer a paper kite. So it's a political will problem. Basically horse power.

Well, this is far too easy.

MR. : Would you comment on the lead plane thing?

ED HERLICH: I agree. Actually, lead planes would be 150 knots slower, and less able to see what's going on than one of these A-10s. If you want to, the A-10s can serve as a lead plane. One of the details I didn't get into is that if, on this patrol, an initial attack air tanker finds a fire, you know, handles it as well as possible, they would very likely lead the next air tanker in to the fire on their way home to reload. So if you're wanting a lead plane, use an A-10.

MR. : And the way you have the tank set up, in your design, multiple passes?

ED HERLICH: Sure.

MR. : And how effective is it to get through the canopy, and I mean, we hear stories about you've got to have a certain size load, or you can't get it down to the ground, things like that. Can you give us an idea of how this would work?

ED HERLICH: I did not put this into the detail you've got, but let's call it a weapons system. The A-10 already has one. So, in operation, we would suggest that since most of the computers are already built in to the airplane, a drop would be either on a lone initial attack, or under ground control. Someone would set both the line on the ground, and the coverage level -- three, four, five, whatever it's going to be. The pilot would dial that coverage level in to -- let's again call it the weapons system, delivery system, which would then measure everything else that's going on, the ground speed, the air speed, bank angles, altitude above the ground, because all that stuff's already in the airplane.

And set the pressure on the tank to deliver when the pilot flies within whatever the limits happen to be, which would be both air speed limit and altitude above the ground. So if you want, say, coverage level five, dial in coverage level five, the head up display has an indicator, it says if you're too fast -- you're not going to get too slow -- but if you're too fast, fly in to the parameters, fly the constantly computed impact point, which is a bomb site that looks just like the ones in the kids video games. There's a point on the glass in front of the pilot, that says if you push the button now, whatever you're doing will impact that spot. Period. In fact, the kids video games have to just about triple the speed at which that happens, because they get bored otherwise.

So the pilot would set the retardant system, wait till he's flown within parameters of roughly 200 knots, roughly 150 feet, fly that constantly computed impact point to the start of the line, hold the button down, fly it to the end of the line and let go. If that takes the whole 2,000 gallon load, fine. If it doesn't, the system stops. Fly around and drop the next line, or whatever. And all of that would be done if necessary on infrared, which works very well through smoke. Infrared does not see smoke -- cold smoke. It sees hot smoke but not cold smoke. Did that answer your question?

MR. : Yes.

ED HERLICH: They don't miss. Even the Forest Service has said that they won't miss.

MR. : Questions? Anything else of the panel?

MR. : I thought you said they had bigger bladders. (Laughter.)

MR. : Maybe not. But we will take a 20 minute break. Thank you very much.

(Recess.)

MR. : -- audience that you might be sure and give a nice introduction of who you are and why you're here.

MR. : Well, I've got a bio at the back of this.

MR. : Well, just briefly. Just briefly so that --

BILL LAYMAN (?): Okay. I'm Bill Layman. I'm 77-years-old. I'm a retired civil servant, Air Force civilian. I joined the -- I was in the -- also (off mike) rank of corporal into the Army, got out, Ph.D. in theoretical physics, not rocket science. And I got -- joined the Air Force Institute of Technology 15 years, went up to the Pentagon as Deputy for Laboratories with the Secretary of Air Force. Got fired from that. Went to Air Force Research, Director Air Force Research, got fired from that and went to the Director of Air Force Weapons Lab, retired and wound up as an Air Force scientific advisor and professor at the University of New Mexico. That's back (inaudible), okay?

Why am I here? First of all, I've got past, present and future I want to look at. You know, I am the past. Thirty years ago I worked with Hank McGrewen (ph) in the Forest Service to set up the MAFS system and also how does the Air Force cooperate with the Forest Service. It never would have happened without the support of Secretary of the Air Force Robert C. Siemens (ph), who was a giant in this business. And he supported that. He took it to Mel Laird and he sat down. Mel Laird says, "It's fine, go ahead." We did it and I'll tell you some of the things we did. The MAFS was only a part.

That's past. On the present, this summer, on Saturday night June 15, with 30 minutes' notice we evacuated our cabin in Colorado. We spend -- we've got a cabin down in Fort Ransis (ph), Texas. We never see the state forester down there because he says there ain't any forest at Mustang Island. But we wind up -- we have a cabin in Colorado, it's on the Pine River. The Missionary Ridge fire started Sunday, went over the mountain, and we could see the flames and stuff. Comes down the ridge down to the Florida River, then goes up the next ridge, comes out at the Pine River. We're on the Pine River. We evacuated with 30 minutes' notice.

Our cabin was saved and it was saved because of the ground crews were who busting their necks to get this thing done, and the air tankers and the helicopters that are working the (inaudible.) It was a combined operation. It was not just air and it was not just ground. The two worked together. They saved our cabin. A neighbor's cabin 600 feet down the river burned to the ground. That gives a personal motivation and that's why I'm here.

Yeah. I have -- you asked these other two guys why are they here and what do they expect to get out of this? At 77-years-old I'm not a consultant to anybody, I'm not doing anything, I don't have any stock options or I'm not -- I'm doing this because I want you to fight fires and I want you to win. And it's a personal interest that comes in it. I was impressed with their operations. I looked at their warning reports that they had for the -- for Missionary Ridge fire for the day. Let me tell you they're using GPS latitude/longitude, they've got the crews coming in and are doing

things and are sighting it. That was more impressive than a battalion warning report in World War 2. They're working well.

Now, my experience is outdated, that's past. I talked a little bit about why I'm here in the present, and in the future -- you guys are the future. You guys are the possibility of doing something. So far all I've heard today you're talking aircraft. I want to make three observations or perceptions and I want to make five issues and I want to make six recommendations. And the observations and the perceptions that I have is that your charter does not talk about air and ground operations. It must. You've got to work air and ground together and you can't just do air by its lonesome.

The second observation is that the capacities and tactics of today's air tankers, they don't look like they've changed much from what they were 30 years ago. A few of the later aircraft, but not many. I had the perception that the tanker operators are living on a starvation budget, and the first guy was telling how the government comes out with the contracts and wants to squeeze every cost down and you don't have any flexibility at all. At a cost of a billion dollars this year -- we spent over a billion dollars fighting forest fires, and that doesn't count the bankruptcies and the damage to the economy that we see. The Forest Service and BLM have to be able to do better support for air operations, and they appear to me to be grossly under funded.

The third observation. There appears to be very little hard data and a lot of opinion on how to fight forest fights. When I read Aviation Week letters to the editor here and the guys who like the Russian air tankers are fighting the guys who like the Canadian Water Scooper CL-215, and they're fighting MAFS. They're all fighting among themselves and somehow they've got to work together and to -- you know, to get opinions without -- with experience -- opinions with experience are worthwhile. But opinions based on self-interest, I think they're counterproductive. Those are my three perceptions.

I want to take up five issues. The first one is what would be the benefits of a concentrated air attack, as distinct from today's close air support on spot targets? Put out a long barrier instead of just hitting individual spot targets. The second issue. You know, with today's economies and the budgetary considerations, what can you do to upgrade the air tankers long term and short term? And you've had some -- if I were listening today, I'd buy A-10s instead of C-130s. But, you know, that's a detail that comes in there. What are the long term and the short term issues?

Third, how do we get some meaningful data? How do we analyze and model and simulate this data? And how do we design the new tests that we need to get more information? And we always have to improve our understanding of the air and the ground tankers that are fighting the forest fires.

Fourth issue: how can the Air Force, the Army and their garden reserve forces appropriately and effectively support the Forest Service and BLM and state agencies? And you've addressed that issue and I would recommend to you that you get Robert C. Siemens, the Secretary of the Air Force, and he would be willing to talk to you, give you some statements on that, if you say how do you do this thing? Because he

did exactly that when he went to Mel Laird, the Secretary of Defense, and he had it. It wouldn't have happened without Siemen's support on this thing.

And then the fifth issue is homeland security, and it was mentioned here. I think it's a real bona fide issue on homeland security, and I'll talk about each of these issues in detail. The first issue: I don't think we've ever had concentrated air tactics to build a wide and long barrier. If I had a dozen C-130s, I could lay down a barrier that's 400 feet wide and 10 miles long in a couple of hours. That means now that any things which are going to jump that 400 foot barrier are going to be spots here and they'll jump it. But they're going to see the -- but the ground crews can call up -- can put out those spot fires. So it's working with the ground crews and the barrier together, and it's massive. We've never done that. We do it with a bulldozer strip. A bulldozer strip 10 miles wide -- long and 10 feet wide, how effective is that compared with a 400 foot slurry….

So those are the issues that I think need to be addressed. MAFS, in the concept I'm looking at this, is not necessarily tied to the C-130s. The concept could be used on other aircraft. The way it started with MAFS was that concept tanks are cheap, aircraft are expensive. Air Force has the aircraft. We had some fire -- 24,000 acres of fires burning on the North Carolina range -- Air Force range a year or two before that. We got together, you know, we sat down.

I want to talk to MAFS and the pictures you've got there. The first picture shows the tailgate down on the C-130. You probably all know that. The people in that picture are the -- to the right side is Air Force people, left side is the Forest Service people. I'm the guy with the red socks. And, you know, that's -- this is the team that worked together. The director of the Weapons Lab is standing next to me. He had a lab director's fund. It was six months from the time that a proposal came in to me at the Pentagon until we tested the aircraft at Morana Air Base in May of 1972.

The next picture shows the MAFS system of tanks that goes on, and the concept was it takes about an hour to put them on or take them off. You put it on there, you fight the fire, you go back to your regular Air Force mission. The third picture is a picture of a drop at Morana. The picture was on the Air Force -- on Aviation Week cover. And Bill Scott says, that was before my time. I was still in grade school or something.

But it was -- the Forest Service liked it because it was effective. And one of the kind of things that came out of that, it took three hours -- it takes time to get things through the Pentagon. We had a request to put -- to use MAFS on the fire in Santa Barbara where four guys got killed. They called a team into the meeting at 8:30 in the morning, went through to the vice chief of staff of the Air Force, got approval. At 11:30 that plane was off to fight the fire. And the guys said, boy, that was a hairy road and they gained a lot of respect for this.

We had -- one of the other things did is walked out procedures and the Forest Service said, hey, you know, it'd be nice to be able to take tanks and move equipment around the country. We got a call 10:30 at night from one of the Forest Service guys and he says how about getting -- we'd like to get 24 fire engines down there to the fire

in Prescott, Arizona, by noon tomorrow. What are the chances of that? I don't know. Let's work the system, see how it works. He did and by 2:00 that afternoon we had 24 fire engines down there from Washington State, Montana, Carolina, Florida, all over the country. They hauled them in there and they credited them for saving 400 homes in Prescott, Arizona.

I don't know whether that's ever been done again. And it's a lot cheaper to haul them down on flatbed trailers, and they hauled fire engines -- for our fire at Missionary Ridge in Colorado they hauled them down from Dakota and Oregon. They're hauling them down there. But if you need it fast and overnight, that was a capability that the Air Force had with all C-124s and C-130s and it did that.

Later that fall we got 12 MAFS and those are the 12 MAFS that we got and I've got a background on that. MAFS were flown all the way from Sumatra to Europe in part of its PR, part of its effectiveness.

I want to go on to the second point. Oh, the other point. Looking at a massive barrier, we had two fires I want to cite. This summer they had a fire in Sequoia, in the Sequoia National Forest that is -- or national park. They saved it. The current operations saved it. Two years ago we had a fire at Los Alamos. They didn't save it, they couldn't. What would massive air power and barriers done on those things? Would it have worked or not? The answer is I think it would have helped, I don't know. There is no data. There's no hard data on those kind of operations.

I want to go on to the second issue on long term things. The Air Force now has -- in their bone yard they've got six AC-130 gun ships, they've got 17 130As, they've got 10 C-130Bs and six 130Vs. They ought to be available. There ought to be a way to make those available in the short term. But listening to some of these things, if I were God and investing my money, I'd buy A-10s instead of C-130s. But that's a detail. That's a detail.

Incidentally, on the C-130s, I was on the Air Force Scientific Advisory Board and worked the logistics costs for the matrix panel and stuff like that. We worked C-141s and their structural failures and so on. If you look at that -- the Air Force had records on all these aircraft. Those records ought to be available for anybody so you can see what the records are. And Southwest Research Institute I know does inspections of things. I don't know what it costs of any inspection. You need some money to do inspections, to see whether they're airworthy or not and that's something to (inaudible.)

In the longer term I'd say, all right, you need more modern aircraft, you know. I don't know about the Canadian Water Scooper, the CL-215, you know. I don't know about the Russian IL-76. I get all kind of opinions. You see them in Aviation Week letters to the editor: "This is good." "No, it's not." There's no data. Nobody knows. And I think all we have is opinions. Modern aircraft are going to take some money and the Forest Service and BLM or the state agencies, there ought to be some way to get them money if I'm looking at a billion dollars a year in just the fire damage, and I've got a lot -- and you've got to triple that for the damage to the economy.

Okay. The third issue I said is adequacy of research, development, test and evaluation, RDT&E, for air and ground forest fire systems. You know, there are -- they've got to be considered together as well as individually. And what I'm hearing today is you're talking individually on the air side of this thing. You've got to see how they interact with the ground, I believe. I'm aware of the Forest Service's Fire Lab. I don't think they have anything in airborne fire fighting.

I'm aware of Boise UBC (ph). They've got great people. I don't think they're funded for the RDT&E. I have a friend who was with NIST, National Institute of Science and Technology. They've been putting bucks into Penn State University for fire research for 40 years. I don't think they have anything on fighting forest fires. I know that there are some university faculty members who have contracts or doing analysis and so on with the Forest Service. I'm -- you know, I'm going to look and say, hey, we need an academic center of excellence which is dedicated to fighting forest fires in the air and on the ground.

And I go back to my early -- I'm older than most of you guys, you know. One of the jobs that I considered when I got -- after I finished my degree was to go with MIT in operations research. They put together operations research capability but how do you fight the battle of the Atlantic when the Nazi submarines are taking our convoys down. And they worked at it and they succeeded and we won the battle of the Atlantic.

Johns Hopkins' applied physics laboratory has -- you know, has been serving the Navy for years and years. That is what their outfit in Annapolis, which is a think tank, has been working this thing for years and years, with some success. The Air Force has the Johns Hopkins -- I'm sorry, the Air Force has its operation. We've got Lincoln Lab, we have the joint service electronic programs at about eight or 10 different universities. That's -- I've got to hurry?

MR. : Yes.

BILL LAYMAN: All right.

MR. : You've got to leave some time for a question or two.

BILL LAYMAN: All right. Okay. Let me hit my points. I would propose that you establish a forest firefighting center of excellence somewhere at some university, and you do it with -- they ought to have a college of forestry, they ought to have a college of engineering, business with operations research. Put those guys together, take the students and faculty, put them on with the operators in the summertime so they're learning what their world is. They get some data, they come back, they model it and simulate it. Then they put it together and go back and get more data and they do that. Then they'll build up a rapport with the operators and that's important. It should not just be an academic kind of an exercise, it's got to be tied with the operators.

Okay, I want to say a little bit about the fourth point on how does the Air Force work this thing. Thirty years ago it was tough selling it. It wouldn't have sold without Siemens, the Secretary of the Air Force. Today you've got the vice chief of staff of the Air Force, four stars, Ph.D. in chemical engineering. He goes off and he flew the MAFS this summer, so he knows that thing. You've got Congressman Jim Gibbons from Reno, Nevada, who was an Air Guard pilot and he flew the MAFS when he was in the Air Guard. We're talking about the politics and we need some leaders to take a hold of this thing.

Phyllis (ph), the lady who is the president of the Pine River Fire Auxiliary, she and I sent a proposal to the governor of Colorado, two senators and our congressman and we're getting some response and some interest on things of how they might work this thing. I think that issue is something. I think the business -- I've never heard anybody recommend a forest firefighting center of excellence. I urge you to put that recommendation on and get that.

Okay. The last thing I want to say is the homeland security. Everybody wants to tie their stuff onto homeland security because they think there's money there, you know, so they want to tie it up there. I think there's a bona fide issue of homeland security. If I were -- terrorists aren't dumb. I could take a bunch of pop bottles, beer bottles with gasoline and a wick in it, sort of like -- they call them Molotov Cocktails. I could throw those out. I could take a 60 millimeter or an 81 millimeter Warner (ph) in the back of my pickup truck and go out in the boonies and so on and I'll fire a dozen white phosphorous charges all around and I'll set fires all over the place.

You're talking about the detection with the I.R. Great. That's unique, that. You also need the quick reaction capability. You hit them fast, you know. There is a bona fide issue on homeland security. So I urge you, one, enable -- do something to enable concentrated air attack, massive air attack on forest fires and see what good that does. And if can improve air/ground operations, that's motherhood. Everybody says do that. And upgrade the air tanker forest -- motherhood, everyone's saying it.

I urge you to establish a major RDT&E program at an academic center of excellence. And I could -- you know he'll want it in Texas, you know, but they ain't got that many fires in Texas (laughter.) Then I, you know, urge you to continue and enhance the cooperative efforts between the Air Force and the Forest Service and the BLM and build up the appropriate interaction between the Homeland Security Department. Thank you. You know, it was fun to come here.

MR. : No, well, thank you. That's -- obviously you put a lot of thought and time into that presentation, and we appreciate it. And I do very much like the recommendation on an academic center of excellence. I would like to do some checking. I'm surprised that there -- if there hasn't been more exchange, if there hasn't been, between the --

BILL LAYMAN: Well, we've got --

MR. : -- academic world and the --

BILL LAYMAN: We've got bureaucracies and terms, you know, and one of the kind of things we did when I was Air Force Research, we put faculty out in the Air Force laboratories in the summer. We put -- it wasn't for money so much as the color of money. We had -- we put the money in. We did the procurement, we got it in on time. So all they had to do is say, hey, we want it. Without that it wouldn't happen. That center of excellence could do that kind of role. You need some flexibility.

MR. : Well, the University of Tennessee would probably be a good neutral site for -- (laughter.) Do you know Vice Chairman Fogelson (ph)?

MR. : I've talked to him. I have a friend who --

MR. : Well, if you could help --

(Cross talk.)

MR. : If you could see if you could get an appointment for the panel to -- Blue Ribbon Panel to come visit with him, we'd appreciate it.

MR. : I'm sure he would. You know, I'll give you 10 to 1 odds that --

MR. : Well, we will delegate you to see if you could set that appointment up for us.

MR. : You're on.

MR. : Okay. I have one other question and then I'll pass it to the other panel members, and this is not to be deducted from your time. And that is are the red socks you have on today the same ones that you wore in this picture? (Laughter.)

BILL LAYMAN: Well, (inaudible) sir, and let me tell you -- you know, when you're a civilian in the Pentagon, you know, you're a bureaucrat and you've got to do something to stand out. Now, some guys would grow a beard. None of you guys have beards. Some guys go around with their fly open. I wore red socks. (Laughter.)

AL HYDE (?): Are they any more uplifting questions?

MR. : Thank you very much for being here and we really appreciate your presentation.

BILL LAYMAN: Well, I appreciate the opportunity. I hope you guys win. I hope --

AL HYDE: -- Jim, you're up next.

JIM BIGGERS (ph): This is a copy of that new magazine that just came out on the state of the forests and what's happening in them. I'll leave this with Al for you to look at later. This is a very large presentation for my very limited time. This

is going to be a little like sipping from a fire hose. But I will stick around as long as you'd like to discuss it in more detail.

I kept trying to figure out what to take out of this and just couldn't see how to cut it down any further. So what we're going to do is skip through a lot of the slides very quickly and come back to them at your leisure at another time. My name is Jim Biggers. I am a multiply retired aeronautical researcher. I have forgot how many times I have retired. I just can't seem to get it right, so I'm still not really retired.

I want to tell you about a new firefighting airplane design. It was designed by some of my former students from Embry-Riddle Aeronautical University over in Prescott, Arizona, where the fight came within 800 yards of a friend of mine's house. It was really scary over there. Here's our design team on the second page. We have briefed this thing to a lot of people. I have NASA Ames so interested they've loaned me an office even though I'm not officially part of their operation.

The next slide shows how we've evolved ground firefighting equipment and how we haven't done much evolution in aerial firefighting equipment. The next slide shows some of the current ancient antique airplanes that are flying, which the exception of the CL-415. But in the West most of the lakes are dry from the drought and there ain't no place to scoop, and the CL-415 carries around all this extra weight in hull and equipment and scooping gear and so forth that is just wasted.

The next slide shows the things that are at risk. I'm trying to obtain information on what the fire this year so far has actually cost the public in terms of assets, property damage, firefighting expense. I haven't got those numbers together yet, but I'm working on it. Turn the page. The next thing shows you that there are only 35 or 40 actual active operating aircraft under the Forest Service contracts. I got this from Bill Broadwell (ph). The next one is a picture of that terrible thing where the 130 shed its wing and went into Yosemite. I think it clearly indicates we need some change and I'm really happy to hear other people backing that up.

So with all that as background, this design team had a mission statement that you have in front of you there. I'm not going to read it. The important idea is to rethink fighting wildfires. I think we've got a lot of support from that today. Decentralize, have aircraft that will operate from short fields at high elevation, because that seems to be where a lot of the fires occur. Very few of these forest fires occur at sea level.

We want to have a multi-mission aircraft so that people can employ it with other things when they're not fighting fires, and so forth. Maintain -- another important point is sensors, and we'll talk about that some more. So they came up with a mission statement which is here. They've settled on a about 2,000 gallon payload from -- coordinating with the Forestry people in Prescott National Forest there, and the California Department of Forestry, FAR part 25 certified as the goal.

The mission profile is what they came up with in talking with the firefighters. There is between number five and seven there up to a two-hour loiter if required. The next page shows a sketch of the aircraft. We want it to be safe, efficient, low

maintenance, cost effective, multipurpose and it's designed to fly low and slow so that you can put the payload on the target.

The mission performance they came up with -- now, what I have here is a preliminary design. We're going to need some bucks injected to carry it out to a detailed design over the next year. Stall speed 77 knots, cruise speed 270, designed to do the delivery at 2Gs at 130 knots drop speed. We put in a huge amount of excess power. It'll take off and operate from a balanced field length to 4,510 feet. And even with one engine out, it'll climb at 770 feet a minute.

MR. : Excuse me, Jim, this is all fully loaded?

JIM BIGGERS: Sir?

MR. : Fully loaded?

JIM BIGGERS: That's fully loaded, yes. The next chart is field length versus elevation. Now, this is about a 40,000 pound gross weight airplane rough order of magnitude. And on that next chart you see it empty, half loaded and fully loaded, the different missions versus field length. Turn the page you'll see it's got a fighter type cockpit. It's designed to have two seats tandem with plenty of visibility, because a lot of the current aircraft you can't see out of the right side of the airplane. They chose the Pratt Whitney 100 series engines. There are many of them in service. It's 9,000 hours time between overhaul. It's a standard engine propeller package that's widely used on commuter aircraft.

The next chart shows you that --

(Tape change)

There's a lot of excess power for safety. Turn the page. Pretty standard. Cantilever high wing -- about 100 foot wing span. Turn the page. It's single sided trailing-edge flaps. If shorter fuel length operation is required, it could be redesigned to have double sided flaps and reduce fuel length.

Next page -- payload and integration. We're talking about interchangeable tanks in payload bay designed for this purpose and you can put different kinds of tanks in there. You can put different types of other payloads, cargo, sensor suites. We're talking about computer controlled delivery. I agree with, I think it was Ed, earlier, who said we need to do something different besides just open the door and let her fall. I think we need some research done in that area and there are facilities around where we can do that. Stability and control -- it's designed to be quite controllable even with a single engine out and it's also designed to have a little trim change when you release the payload.

Next page -- landing gear retraction. The gear folds forward to retract so that if you have systems failure, you just let her drop and the gravity and dynamic pressure

will take care of putting the gear down for you. This is not a new concept. They've had it since the DC-3. Minimum CG (ph) travel on drop so you don't have an abrupt trim change. Multiple use payload bay -- firefighting and agriculture, forestry, disaster recovery, sensors, cargo. The more things we can make this thing do, the more of them we can probably sell and reduce the cost for the firefighting mission. We listed a bunch of kinds of firefighting missions that aircraft could be used for, not just this one. Wild fires, airborne mission control, about fighting fires on oil platforms and ships and refineries.

Next page -- firefighting payloads. All the usual things but we started thinking about what if you dropped a bunch of CO2 pellets. CO2 is cheap and easy to make. There're machines that just make it out as fast you can load it in and that would take away two of the three legs of the fire. You can't do anything about the fuel, but we can take away the heat and oxygen. We don't know of anybody who's been thinking about that.

Turn the page -- there's some agriculture uses that could be applied. Disaster recovery -- how about using these aircraft when you're not fighting fires. Oil absorbent material on an oil spill and you can think of a lot of other things. We started thing about, you know, you got 18,000 pounds of payload here. You could use it for a pretty sophisticated sensor package or make it multi-purpose, make it modular. There are a lot of sensor needs -- and, by the way, my colleagues at NASA Ames have already demonstrated a system to go on an aircraft and map the fire with I.R., GO rectify the image and put it on to an electronic map on the ground. That's already been demonstrated.

MR. : By datalink? As you datalink it to the ground?

MR. : Yes. I'm really in favor of a lot of datalinks. One of the other you could use aircraft for by the way is when the ground firefighters get down in the canyon, their line of sight VHF radios become useless. Why not use the airplane for relay? And the other thing, by the way, on the sensor package is -- I don't know if you noticed but pipelines and electric grids go through national forests and in some of those fires in eastern Arizona, they had to reroute some of the power grid and just the rerouting of the power grid cost about $2 million.

I think we can make a minor adjustment to the design to handle standard air cargo containers and make FedEx and UPS happier. Initial estimates are about $15 million a copy. Those have to got to be refined over the next year and the next page shows you some of the cost comparisons that we came up with. Wouldn't swear to the accuracy of those. That's just the best we could get. Cost effective. We want to maximize off the shelf technology. There's a lot of new stuff out there that's not been used and we need to grab hold of it and, you know, the main job would be integrating. This thing's got larger operating safety margins, superior field of view. You're starting with a zero time airframe and very reliable serviceable turbo props. It's designed for quick turnaround, upright from small fields, efficient loiter, flight maneuverable and high cruise speed.

There's a map of Arizona there -- doesn't show up very good in this light my copy, but with six of these airplanes stationed at existing airports in Arizona, you could cover most of the national forest in the state and that comes back to this gentleman saying we need to -- when you get to red flag condition -- station the airplanes there and those circles represent where you can get within 10 minutes and the idea is to put the fire out before it grows.

Next picture is a photograph of the wind tunnel model that's already been tested. It's a small scale model about four foot wing span, something like that order. And the next ones are some pictures of how it might look in operation. So that's -- you're sipping from the fire hose, gentlemen. I remain available for your questions. One of my partners is also urgently working on getting a wildfire technology center going and we need to hook him in here together because I think that's going to be the key to a lot of things. There's a lot of pieces of research that haven't been done.

To improve our design and make it more confident, I would like to have a whole bunch of flight data on the existing fleet. What levels of turbulence are they encountering? What G loads are they encountering? How big are the up and down drafts? I don't know. But I'd sure to like to know to refine my design. We've already been briefing a lot of people. Al has a list of the number of people who we've briefed. Like I say, NASA is interested, the Army is interested in helping out. The Yuma Proving Ground said, hey, we've got a lot of air space, if you need flight testing for any of this firefighting stuff, give us a call. Okay. They have a lot of air space, they may not have all the precision ground equipment you need, but they ain't too shabby either.

So, and the other thing I want to draw your attention to is something that's not in the presentation. There's a process, a decision analysis tool called analytic hierarchy process or AHP. A friend of mine in DC at George Washington University, Dr. Ernest Foreman (ph), is one of the foremost experts in this and I would urge you to take a look at it as a decision tool that is really hard to put a spin on. It'll tell you the truth. I used it to develop a program for NASA for a new commercial tilt loader aircraft. They were trying to figure out what needs to be done to enable the commercial tilt loader aircraft at some future date and this came right down and focused right in and ended up with a very highly focused R&D list of items.

MR. : And you'd suggest that this appropriate for determining what the Forest Service needs?

JIM BIGGERS: Yes. I'm going to get an advisory panel on this aircraft. I'm going to use it to know what parts of the design are really important. What it does is develop proportional priorities. Like your first priority may take 60 percent of the total priority and the next one 25. So you forget about the rest of them. If you see what I mean. So that is the end of my presentation.

MR. : Could you clarify one with regard to, you know, the slideback you're looking at the initial attack firefighting power using an unmanned aerial spotting platform -- your design -- clearly you're not contemplating the use of any lead planes

in that notion. For large fire support, would you envision using this aircraft with lead planes?

JIM BIGGERS: No. I think we can get away from lead planes with today's technology. You put GPS on the aircraft. Flight following. You can use radar, you've got IR, you've got UV. Put some sensors in the aircraft so that you know where you are and where you're supposed to go and you could just have a flight following thing in the aircraft. Other questions?

MR. : Have you briefed or shown this to any aircraft manufacturers? And so what kind of feedback do you get?

JIM BIGGERS: Not formally. I'm trying to stay away from Boeing and the big manufacturers because, in my mind, that's a little bit like a mouse making a deal with an elephant and, if there's a scare, guess who gets smashed. So we're looking for smaller air frame manufacturers who might be hungry and eager to do this.

MR. : What's been NASA's response -- I'm trying to see what the connection is.

JIM BIGGERS: NASA is very interested in doing support things like set up flight simulation and if we can get some data on what the environment is like, they can make that into their systems. They have a tremendous capability there. At Ames we're doing systems analysis and I've got a whole other presentation that is on that CD that I gave to Al taking the strategic systems approach to fighting wildfires, including ground vehicles and more agile ground vehicles to get down into the canyons and places where the fire happens and the trucks can't get.

MR. : In November of 1974 NASA did a technical memorandum on the operating experiences of retardant bombers during the firefighting operations. And it was done on the DC-6B airplanes. Have you chatted with anyone at NASA Langley? Do you know if there's been any other studies called up on this?

JIM BIGGERS: But I can. I know folks there. I was a NASA employee for over 20 years and then went to the Navy's David Taylor Lab.

MR. : Wondering if you -- so some work has been done. We didn't know what NASA had gotten involved or interested.

JIM BIGGERS: I know nothing about this, but I'd be glad to become informed.

MR. : I haven't looked at that yet either, Jim, but I think it's the closest thing we have to characterizing the environment.

JIM BIGGERS: Yes. How large are the up and down drafts? What's the temperature variation? I've found that there is a manufacturer of inexpensive recorders. I don't know what they mean exactly by "inexpensive" but I know that their orders of magnitude are less than the ones that are indestructible and I would

like to get somebody to find -- equipping our existing fleet with these things. Measure the outside pressure. Measure the outside temperature. Measure the Gs. Put a GPS record on to it. Whatever other data we may need and that couldn't be terribly expensive compared to one airplane.

MR. : I'm just trying to understand why it hasn't been done. If there is any explanation because, obviously, it's something that without that data and that information you can't do the things necessary for the safety of the flight.

JIM BIGGERS: My opinion is that most of the forest fires are in what the politicians calls "fly over" country. And until this year when we had a lot of wealthy people's summer cabins destroyed and the smoke was going everywhere, it just didn't get to the public's attention. When I compiled these cost numbers I think you're going to be astonished.

MR. : And this project, basically, you did with your students at Embry-Riddle?

JIM BIGGERS: This was a student design but they got so interested in it that they did way more than any student design I've ever seen and I would qualify that as a genuine preliminary design. We have a design book and CDs and all kinds of data.

MR. : And I guess I have to ask, is this Ben Affleck? Is that the actor?

JIM BIGGERS: No. Unfortunately. This is a young fellow.

MR. : I was just noticing your committee here and all the names and I had to see whether Ben Affleck was an actor or not.

JIM BIGGERS: Well, if he was maybe we'd have a little start-up funding.

MR. : Well, I was hoping that that would be the case.

JIM BIGGERS: But I think we need about $2 million for one year design definition and refinement. We need to do some trade-off studies. NASA's willing to help. The Army is willing to help. I've also contacted Army rotary wing people about including a rotary wing firefighting capability. They're looking for additional justification for a heavy Army rotary wing vehicle and I think we've got one.

MR. : Either of you gentlemen familiar with any time the United States government has actually gone out with the specifications to procure an aircraft other than for military purposes? Is there a precedent that we aware of? Because what we're talking about here is the Forest Service or the Department of Defense or someone putting money into the development of an aircraft specific for this mission.

BILL LAYMAN: (Off mike.) Well, you've got to (inaudible) a structure. You have a Forest Service fire lab in Boise. If this were Air Force you'd be (inaudible) Air Force Research Lab, they'd get some interest, they've got some contracts. They have the structure in place to do the (inaudible). I think what's

missing is that the Forest Service and the DLM (ph) -- I don't whether there's turf battles or what, I don't think there's anything like that in these Forest Service for development of aircraft. Just listening to this, with the kind of bucks we're talking about in national things --

JIM BIGGERS: It's trivial.

BILL LAYMAN: -- We had three restaurants went belly up (inaudible). Five people I know lost their houses, they were foreclosed on. The marina's gone. The trade in Durango is down by 35 percent and they lost -- nearly lost 30 million bucks this year --

JIM BIGGERS: We lost two entire communities in eastern Arizona. How could we not do this?

BILL LAYMAN: There ought to be something, some system, so that the Forest Service work with NASA or with airports or whoever say, hey, let's look at this thing and we'll put it into the RDT&E cycle (inaudible) and see how we do it.

JIM BIGGERS: I appear entirely at my own expense on my own initiative because I recognize this as something important, I believe must be done. I will do anything I can to help.

MR. : Well, all the folks who we've had that have attended the meeting are very motivated and interested in this area. We appreciate very much you all's presentations. Thank you very much for your time and the thought and effort that has gone into what you've put together. And we'll be looking forward to knowing when we can get our appointment with the vice chairman.

BILL LAYMAN: What time frame -- you got November 15 now.

MR. : Make myself available and I'm sure other members of --

AL HYDE: Negotiate a schedule over the break. Right now I need to have a break.

BILL LAYMAN: Yes, sir.

(Cross talk.)

MR. : I'm out here observing all these ties, these western ties and belt buckles. I'm going to have to get some information here in the break when I can purchase one.

(Laughter.)

(Cross talk.)

MR. : Gentlemen, it sits on top of Georgia, Alabama and Mississippi.

Bill, thanks for joining us.

BILL WALTMAN (ph): Good morning. My name is Bill Waltman. I'm a professional wildland firefighter. The tool I use is a fixed wing aircraft. The 2002 fire season is the 34th year I have worked as a wildland firefighter. The following statement is based on the experience of my career. The three areas of concern in using air tankers are safety, effectiveness in fire suppression and cost effectiveness. Safety is the most important of these issues. Fatal crashes are the most important issue.

The federal agencies contracting air tankers have a very limited program to prevent fatal accidents. The agencies' only mention of fatal accidents is to display bar graphs showing the trend is going up or going down. Military and airline crashes are analyzed to the smallest detail and the results are published so the flight crews can see that there is a chain of events that lead to the final impact. Classic examples of this are abundant. The DC-10 crashed while the crew tried to fix a faulty nose gear indication. The reenactment of the last minute of the DC-10 flight done in a simulator has shown many pilots the value of somebody flying the aircraft.

I have heard guest speakers from the military and Forest Service meetings go through the analysis of military crashes and show the many events in the chain and, if recognized by the flight crew, could possibly prevent the crash. No such speakers, no such publications, no analysis of any air tanker crashes have ever been made available in the world of air tankers. All accident reports are top secret and I have been told on occasion they do not exist. The information available in these reports is invaluable as a tool in training tanker pilots in accident prevention.

The same mistakes keep killing tanker pilots. Over 90 percent of air tanker fatal crashes hit the ground with the retardant still on board. The Forest Service issues a card to ground firefighters showing 10 Watch Out points that could lead disaster. Some of these include you don't know where the safety areas are located, no lookout on the fire, unknown weather in the area et cetera. The tanker pilots would be more informed with the same kind of card.

The Forest Service has an annual aerial firefighter academy and an air tanker lead plane pilot meeting every two years. These are ideal venues for accident prevention training and accident analysis discussion. The aerial firefighter academy should have a class on accident analysis and prevention. New tanker pilots are trained by previously carded tanker pilots. There are no standards or requirements for instructor pilots. If a pilot is willing to sit in the right seat and instruct, he gets the job. There is a wealth of experience, expertise, in the industry that is not being passed on to the new pilots. We need ways to identify the information and a vehicle to disseminate the information.

The fire suppression effectiveness and cost effectiveness are tied together. The elements that go into effectiveness are accuracy of delivery, load size, type of retardant and time between loads. If all the aforementioned elements are optimized, the cost effectiveness is also optimized. Accuracy of delivery is determined by pilot

technique, aircraft drop system, type of retardant and the fire environment including wind, terrain, fire intensity and vegetation height. Improving pilot technique requires real time, objective drop reports from the lead plane pilot, air attack officers, or ground observers.

The Canadian system is the best available. Their bird dogs judge each drop by one-quarter door length and one-half door width. They will say bulls eye for an on target or, for example, half right, one long (ph) for a miss. The accuracy call is made as each drop hits the ground so the pilot knows his drop effectiveness. In our system most bad drops get a subjective comment. Some of these comments are: well, that might help or, gee, the wind got it. That doesn't help the pilot when he comes back for another drop. Consistent bad drops from a particular pilot should require additional training or grounding.

The load size that is effective depends on the turnaround time and fire conditions. The delivery cost of $6 a gallon to send a single engine air tanker with 500 to 800 gallons on 50 miles or more from base in ineffective because of small load size and long delays between loads. Large air tankers with capacities of 2,000 to 3,000 gallons would lower delivery cost to less than $1. One of the problems we face today is the people that select the reload bases. Bases selected should be the closest available base.

The on scene people in charge of the air operation should make the selection. In the current operating system, the selection is too often made by a dispatcher who is afraid of losing resources claims as his. Empire builders subvert good firefighting practice. This year I was on a fire where tankers had been making 350 mile round trips rather than 150 mile round trips because a regional border was between the fire and the closest base. Making 350 mile trips a DC-4 can make two trips and does not have time for another trip even with one hour flight time remaining in the day. Making 150 mile trips, a DC-4 can make at least five trips.

Aircraft drop systems have improved through the years a new single door computer controlled constant flow system to do the best job. Getting newer systems in the industry can be best be done by contract awards based on performance. Outdated inefficient systems will be replaced when competitive bidding makes an essential part of obtaining the contract.

There are two basic retardant types, thickened and unthickened LC (ph). We now face the possibility of losing the unthickened type. This decision, if carried out, will have an adverse effect on air tanker effectiveness. You can see the results of the two types dropped on the same fire by color difference. I have worked fires where the retardant comes from two bases, one base with each retardant type. I have seen the fire burn through the thickened retardant drops while on the same fire line it is stopped by the unthickened retardant. The addition of thickener to retardant raises the surface tension and helps prevent load drip in high wind conditions. On the ground the same property prevents penetration through overhead canopy and thick ground fuels.

There is little feedback between the air tanker industry and the end user of the product, the incident commander and those on the fire line. Fire critiques should have a representative from the air tanker industry. This would give the IC a chance to address air operation concerns with the service provider and not have to rely on second hand information. The industry representative would be able to input the concerns of the pilots that work the fire. I was present in a critique on one fire that I worked and it was beneficial to both the IC and to me.

Air attack schools, lead plane schools and dispatch schools should all have air tanker pilots in attendance at least in an advisory capacity. I've been in an air attack school and several dispatch meetings. The benefits go both ways. If people do not have good information they do not make good decisions. In the dispatch system used for air tankers the people tasked with the dispatch responsibility in many cases have no training other than how to fill out a resource order. In some cases they make the decisions based on the card system -- if A, then B. If not A, then C. This may save money by not having higher trained people but wastes much more money in ineffective use of aircraft.

There must be training courses established for dispatchers. At the least this should include understanding the performance capability of the different type aircraft, reader the tanker contract and spending time at a tanker base to understand how a system works from the base. Dispatchers must have defined areas of responsibility and authority. The base managers have a training course they attend and annual meetings on the contract. The base managers do not have a national standard defining areas of responsibility and authority. Dispatchers who, in some cases, have other agendas, make decisions that should be made by tanker base managers.

I could write a book full of examples of the above problems, but will write only a few. A fire is reported 25 miles west of Chester. That would put the fire 35 miles north of Chico and 45 miles south of Redding. The fire was in heavy timber on a steep slope at the height of the burning period. The Chester air attack and tanker were dispatched for initial attack. On the arrival at the fire, the air attack ordered two more tankers. I and another tanker were ordered from Chico and then cancelled. When we inquired why we were canceled, we were told it is more efficient to divert airborne resources than launch new ones.

The airborne resources were two S2 aircraft 35 minutes from the fire with 1,600 total gallons. The two aircraft held at Chico were 10 minutes from the fire with 5,000 gallons. The (a) then (b) system does not work.

An example from this summer. The fire was on the mountains just east of Tucson. Twelve tankers were flying on the fire from Fort Huachuca. The regional office noted that the tanker base directory showed that Fort Huachuca could park seven air tankers. The Fort Huachuca manager was told to move five tankers to Silver City. The military had provided the base with additional parking, so the 12 air tankers were not a problem. The fire was 50 miles from Fort Huachuca and 120 miles from Silver City.

The base manager would not or could not fight the regional office, and the dispatchers sent the list of tankers to be flown from the two bases. The aircraft based at Fort Huachuca was to reload Silver City and the aircraft based at Silver City was to load Fort Huachuca. The dispatchers did not take the time to determine home bases. They did not investigate the actual conditions at the base. The base manager had no idea of his authority. The result was a well run, effective air support system turned into chaos.

The preceding statements do not list all the problems and certainly do not solve all the problems. However, they do illustrate what I believe to be the most salient problems within the industry and the government agencies, a lack of communications in the area of safety, a training system in both industry and government that does not use 40 plus years of experience. The people in both government and industry with the most experience in aerial firefighting are now leaving due to retirement. Many new people coming into this system are trying to reinvent the wheel.

Air tankers are a valuable tool in fighting wildfires. Their continued and improved effectiveness can be assured by the ability of the operators to acquire new aircraft and develop more effective and efficient drop systems. The government's most crucial role in the advancement of air tanker industry is to make new aircraft available for purchase by the operators.

MR. : Bill, for the record would you state your current affiliation or what your -- you got your experience factor in here, I just didn't get the other --

BILL WALTMAN: All right. I work for Aero Union Corporation. I'm a captain on a P3 aircraft. I have flown B-17s, B-26s, C-54s, C-119s, SP-2Hs and P3s in the Fire Service.

MR. : Thanks, Bill.

MR. : Well, thank you, sir, for your presentation and of course what you said. I would like to point out that in regard to the ability to put together and learn from aviation accidents that have occurred in forest firefighting, and there has been the NTSB since the Pressler Bill has been investigating those accidents and making reports, but without -- these aircraft have no flight data recorders, they have no cockpit voice recorders. And most of the time in my experience where you have been able to really learn from a fatal accident is when you had the proper recorders in order to find out exactly what occurred.

The NTSB is reopening an investigation of a C-130 accident that occurred in 1994 that may be very similar to the accident that occurred this summer. And if that is the case, then it would be because of the failure to have that type of equipment on these aircraft that the lesson wasn't learned eight years ago and the mistake had to be repeated this year.

Flight Safety Foundation has done a good analysis in April of 1999 of a number of forest firefighting accidents by a gentleman who you may be familiar with,

Patrick Valette (ph), who says he was a professional pilot who has flown Twin Otters and Shorts in aerial firefighting operations. And unfortunately, of the -- what information is available, even on the basis of the accident investigations without the type of technology doesn't seem to be there's a structure within either the pilot community, the Forest Service or the industry to pass this information on. Is that basically what you're saying?

BILL WALTMAN: That's correct. And I think that notwithstanding the structural failures of some mechanical failure within the aircraft, I think the circumstances of these accidents -- just briefly there was an accident several years ago where there was a trainee pilot in the left seat, instructor pilot in the right seat was the pilot in command. They did a fuel analysis by the company that owned the aircraft, showed that they were very short on fuel on arrival. It was the last drop of the day, they were to be released from the fire to return to the home base.

Their wives had just arrived at the home base and they hadn't seen them. They had made one attempt at dropping and it didn't work and they had to go around, and another go around would have put them seriously short on fuel. What parameters had the instructor pilot given the student pilot on when to go around? When I instruct people, if they're turning final and they're off the line and the hit a 30 degree bank, they have to go around. In this case they went to an extremely steep bank, tried to pull the airplane back onto line, stalled it and went in the trees.

All of the circumstances that lead up to the final impact that put people in the scenario where an accident is most likely to take place are the things that can be done in training sessions so that people can see that they're in that same situation. When you leave a base with a minimum fuel supply to drop on a fire, I can guarantee your most attention is not on hitting the target, it's on trying to get back there before you have to feather an engine or two.

In years passed, when I started in this industry, it wasn't that unusual that someone came back with one engine feathered because it was out of fuel. Things have certainly changed. When I started we went seven days a week, six months with no days off. We used to offer aid (ph) at night and retardant in the daytime. And I went 56 hours of flying with an hour and a half sleep, and everybody just said, well, right here in the contract says he owes another eight hours.

Obviously we've come a long way from them, the equipment has improved and everything. But I think these accidents -- it's been politically incorrect to mention that we ought to have meetings and go over these accidents and these scenarios to show people where they are and how they can stay out of the scenario where you're going to get into a situation where an accident is most likely to happen. Just there is no discussion of it in any venue put on by the agencies, and I think that's a real mistake.

MR. : It's a very big mistake and very unfortunate and quite unusual in the aviation community.

BILL WALTMAN: It is. And I have pushed this for several years and brought it up with many Forest Service people and they have frowned upon --

MR. : I was in Boise yesterday and asked them whether they -- what had been done in regard to this study that the Flight Safety Foundation did, and I did not got any positive response.

BILL WALTMAN: The Reno meeting --

MR. : I have no question in what you're saying. I guess the question here is what we can hopefully see in the future that's going to be done to address it, and I'm very interested in seeing what the industry proposes as well as what government proposes, because it is a partnership.

MR. : Bill, I'd like to ask, based on your experience over all these years, how would you characterize the tactics, the aggressiveness of the way fires are fought today from the air? And then also the intensity, the differences in the fires, particularly in this season in the last few years.

BILL WALTMAN: Well, I think tactically -- there have been improvements in the tactics because there's been a retardant evaluation team that was out several years ago that had stripped recorders in the airplane that recorded radar, altimeter, height, airspeed, drop sequence. They had a visual camera on the glare shield that showed essentially the view the pilot was looking at. They had a chase plane with IR and visual cameras so they could compare it. They then had people on the ground that actually looked at the drops to determine the actual evaluation of the retardant drop and see how effective it was, so that was a real, real progress.

When I started in the business, guys built tanks and there was no data, there was no scientific study on how to built a tank or whether you want it to all come out hard or soft. All that's changed through the years. As far as fire intensities go, I've been on fires of the same intensity -- I think throughout my career there have been really large fires. What a lot of the people in the public don't understand, if the fuel and the atmospheric conditions are right, you cannot stop a wildfire.

I was on the Rodeo-Chediski fire this year in Arizona and under those conditions we weren't going to stop it until the conditions changed or it burned out into lighter fuels or something. You just can't do anything at that point. Then you do structural protection and work the flanks of the fire to keep the thing as narrow as possible, and that's the best they can do until the conditions change.

I think that the air tanker industry has definitely improved. I think the pilot requirements -- when I started in this industry, copilots were not carded. They had no requirements. They didn't fill out an application. There were times when guys that just were good mechanics were in the right seat, and that's all changed. The national contract has a national carding procedure. If you want to be a pilot in command on an air tanker there is a national procedure you have to follow to get it. It used to be regional and if you couldn't get carded in one region, you'd get carded in another.

I think the Aerial Firefighter Academy was a step ahead but I think that -- as I stated, I think that they could do a lot in accident prevention by going over these prior accidents and letting people know when they're in a problem area. And I think instructor pilots obviously need to have -- there ought to be parameters for instructor pilots and they ought to teach parameters.

I know an old time pilot that's instructed, and when the student says, well, I need a critique, what did that drop look like to you, and the old timer says, well, you didn't hurt the dirt with the aluminum, well, that was obvious but it doesn't help.

AL HYDE: Any other questions from the panel?

MR. : We appreciate very much you being here.

MR. : Thank you.

MR. : Unless your advice is kind of like the cab driver in DC told me, he says, "Any day above the dirt is a good one."

(Laughter.)

MR. : As long as you're not looking at the bottom of the grass.

(Laughter.)

MR. : Thank you.

AL HYDE: We are -- we'll continue at 1:30.

(Audio break)

MR. : -- the last one we bought was serial number 133, so there's currently 140 of them or something presently operating. I'm here to just say that we appreciate the work that the SEATs have had the opportunity to do on fires. We're not here to say that the SEATs are the only way to go. There are tools, such as the helicopters are a great tool, the heavies are a great tool, the SEATs have been a great tool. In our operations, though, we find the SEATs to be very reliable, they're capable of doing the job that they've been built to do, which is fight fires.

We have real good luck with them. We were on the Rodeo-Chediski, we had them in Montana, we've had them in Oregon, we've had them in Carson City this year, so we've had quite a busy year as everybody has. Some of the comments that I've heard throughout the meeting this morning that you've brought up that I felt like I should at least give our opinion on is one was the TCAS. And I was at the heavy tanker meeting in '94, I believe it was, '94, '95 when they were trying to implement the TCAS. They came up with a discount where if you purchased your TCAS at the meeting you could get $10,000 off or something. It's an expensive tool.

The single engine air tankers aren't required to have TCAS. I do, being a single engine air tanker operator, feel like that is very important that single engine air tankers get TCAS or are required to get TCAS. We were on the Rodeo-Chediski, we had multiple helicopters and multiple heavies and then of course multiple SEATs operating. And of course naturally it's a big fire and a big year, but the TCAS in my opinion is a viable tool that I feel like -- you know, they say rules are written in blood and before an more blood is shed I feel like the SEATs could sure use the mandatory TCAS.

Naturally that's an expensive operation tool so, you know, there's a -- you know, everything costs money and they ask a SEAT operator to come up with more money, the deal with the discount would be a good deal, or to set up a program or something there's going to have to be something on some financial help of some sort or written in the contract or something, or it's just going to cost more money.

Then another comment I've heard this morning is some aircraft that are capable to fly without lead, and I don't see that happening on the fires that we've been on. We really depend on our lead. Our lead and our air attack guys have just been processing -- I mean, we get there to a fire and there's four heavies working the fire and we had five 802s out there plus multiple helicopters. And even with all the aircraft it would be sometimes five minutes or so that the lead would operate without aircraft entering.

But when you got there and show up on scene, at least the lead can tell you we've got a bulldozer in trouble, we've got the guys on the ground. This is where we want it. he's operating with the guys on the ground and I don't think that opportunity will ever be replaced without a lead. So there's got to be some viable communication, and in my opinion, a lead is very, very important.

MR. : Let me interrupt here.

MR. : Okay.

MR. : Sounds to me like you're talking about command and control over the fire, isn't it?

MR. : Yes, yes.

MR. : Isn't that what the ATGS does, as opposed to the true lead plane?

MR. : Right, right.

MR. : I know sometimes I mix it up.

MR. : Right. Sometimes we had lead overhead and air attack underneath, but still on a fire that big or even on smaller fires, when you've got multiple aircraft I feel like you're going to have to have somebody on scene to control the aircraft and keep communication. And maybe I misunderstood this morning that they felt like the

aircraft was capable of doing this without that. Okay, so maybe it was my misunderstanding.

MR. : I think he was talking about somebody to lead the tanker in on a drop, as opposed to the command and control of the fire.

MR. : Okay, okay. Well, good.

Another thing, we had happen after September 11th of last year that I feel like could sure be addressed, that there needs to be a plan set in place. And that was -- after September 11th, the aircraft got grounded. You know, someday that's going to happen again. Who knows when, it may be 100 years from now, but to have -- to be in a fire environment and then the FAA come up and say all aircraft are grounded could be catastrophic.

There is some kind of plan set ahead where the air tanker industry or the air tankers have an immediate plane to go to that the FAA's expecting that -- you know, I know the military aircraft didn't get grounded. Well, maybe they can include air tankers and something of this same nature. I just feel like there needs to be a plan set ahead in case something like this happens.

When we have a 135 operation in Alaska, the problem we had up there that a lot of people didn't think about was you can take fishermen or hunters out and drop them off 300 miles out of Anchorage and they're saying, all right, I'll see you next Friday and then they get dropped off. And the next Friday the airplanes are grounded, and even four days later after they're supposed to be picked up there's still no planes show up to pick them up, well, they get kind of nervous and they think they've been forgotten forever, and there was a lot of panic stricken people in the state of Alaska through all that.

But anyway, I feel like as far as security goes, that if a plan was implemented ahead of time and that ever did happen again, it sure caused us some problems last year through the September 11th program.

Last and least, I'm being very brief and quick, our SEAT program was ran by Mark Bickham. He's a SEAT operator in Boise, Idaho, which is with OES (ph), and he has just done a fantastic job with the SEATs. The guy really needs -- in my opinion he's done a great job, he needs a lot of respect to what he's done. We were having -- and he was asking earlier about safety. We have a vendor orientation meeting on Monday and Tuesday, all the pilots and personnel involved in the aircraft had to be back for another training session in February, talking about multiple training.

So the SEAT operations, we have extensive training and extensive safety reasons that -- you know, maybe because people usually start out with SEATs, that they want more training, but anyway, the training and the safety aspects of the SEATs has been very good due to Mark Bickham.

MR. : Is it in the contract?

MR. : That we do the training? There is things in the contract --

MR. : What is Mark doing that's effective?

MR. : Mark is requiring that we go to Boise and we get training through their OES office. And in this training it's pretty intense because --

MR. : And how is he requiring that, because of the contract or --

MR. : He just recommends. He says everybody --

MR. : -- just force of persuasion?

MR. : We're level 1 carded pilots. We've got five level 1 carded pilots, and he said, "Keep your card, your pilots will have to be at this annual training session." So, I mean, it's -- if you want to fly you go get trained, so sit in through the orientation.

The cost of the SEATs have been very effective and you should have this on your agenda, that the safety record of the SEATs -- you know, they're an aircraft, anything can happen, but I feel like their safety record has been very good. The cost of the SEATs, even thought the 802s, you know, they're an expensive operation. There was a gentleman earlier that spoke to $1.3 million per aircraft. They're not an expensive aircraft to run in the industry. We had an opportunity to run one for a municipality, you got an A-Star at least, and they said, look, you get three 802 for the same period that they had the A-Star, you know, for what they were paying for the A-Star.

So I feel like you don't know what the 802s do, but I don't need to preach a lot about that. As far as the new things that's up and coming, Air Tractor is building a new 2000 gallon twin-engine airplane. You've probably heard him talk about that already. So there's some things coming up he says won't be ready until the 2008 season, but it sounds like there's some pretty neat things happening. I guess my big issues are really the TCAS and our misunderstanding on the lead, so that's really all I've got.

MR. : Are you flying the F model 802s?

MR. : Yes, we've go the F and --

MR. : And the AF.

MR. : What's the second one, I'm not clear on that?

MR. : The AF is one with his -- the AF is a single seat aircraft with his Air Tractor gate (ph). AF is the dual cockpit.

MR. : Have you had pretty good maintenance luck with them? We've heard some stories about 802s that are having wing problems, things like that.

MR. : There is some ADS (ph) and there's some service bulletins out. Air Tractor had their first wing failure about three years ago on a 502, and that's the first structural failure in the history of Air Tractor. And that was structurally related, it wasn't turbulence or something else. Maybe not turbulence it wouldn't include, but hitting a tree or hitting a mountain.

Anyway, they had a structural failure on a 502 and it's made them go back in and look at some of the spars and the spar webbings (ph). So what they've required us to do is they've had 5,000 hour ADs and 10,000 hour ADs where they come in and put in a spar plate. And so far there hasn't been a structural failure on an 802, but there is mandatory maintenance that you have to do at 5,000 hours and 10,000 hours that I don't think would be unusual for really any other aircraft.

MR. : And are most of the seats used on -- by the BLM, so they're used on brush, grass. Are they used much on forests or not?

MR. : We use them in all aspects. We were -- our particular person that dispatches our aircraft is John Silkard (ph) with the BLM. But we were having it on national forest, BLM, state forest. You know, there's 24 exclusive use contracts coming out for single-engined air tankers for this next year, because they all get renewed, just like all the heavies and the helicopters and all that.

MR. : These solicitations out yet?

MR. : No, sir. It will be out -- we have our vendor meeting next Monday and Tuesday of next week.

MR. : Now, who's your fellow that's so good, Mark, what's his name?

MR. : Mark Bickham, he's --

MR. : Is he involved in that solicitation process.

MR. : Yes, sir. He works directly under Bob Carr.

MR. : Have you talked to him about TCAS?

MR. : No, sir.

MR. : Well, you might want to do that.

MR. : Yep, you're exactly right.

MR. : If he also moved you might talk to him about flight recorders and cockpit voice recorders.

MR. : Yeah, I don't know if they have that same feeling about a cockpit voice recorder yet.

MR. : Well, you may not, but that's all safety equipment.

MR. : Exactly. You know, the issues came up for a while in firefighting and being here, at least we've got it on record, my feeling on the TCAS. Is there anything that you all see that could happen in the future on something of that nature that's required, you'd just include it in your contract costs. My fear would be that we bid the contract coming up that's due out in January or February and we have five airplanes, we bid them on exclusive use, and then in 2003 they decide everybody needs TCAS. Well, there's $150,000 we need that we didn't figure into our bid of January of 2003.

MR. : Well, the Blue Ribbon Panel's recommendation will hopefully be done before the end of November and the people that make those decisions will have our input in front of them. We do not have -- obviously we don't know what they're going to do with our recommendations.

MR. : Do you have any indication on you all's feeling or what your recommendation would be for something like that? I mean, you all agree or disagree?

MR. : I guess each person here would have to speak for themselves. I spent seven years at the National Transportation Safety Board and there's no question the value of TCAS, as well as if you're ever going to find out what happens in an aviation accident, you've got to have recorders to do that, otherwise you're guessing -- in most accidents, most accidents.

MR. : I think your question partly was are you going to get stuck with a lot of stuff that is not covered in a contract. And I only can speak for myself here. It seems to me if the federal government is going to require things in the contract that are not there today, then they're going to have to pay for the new requirements.

MR. : Yeah, well, that would be good. Alright. Well, that's all I have. I appreciate your time.

MR. : Thank you.

MR. : Thanks.

MR. : Reintroduce yourself and introduce your colleague.

WOODY GRANTHAM (ph): My name is Woody Grantham. I'm with International Air Response at Chandler, Arizona. We're a heavy tanker contractor, not with the U.S. Forest Service, with the state of Alaska and with foreign governments. With me today is our chief of maintenance Mr. Fritz Wester (ph), who is an AI, a C-130 expert, was a C-130 maintenance person in the Air Force. And since that time he's been with our company and has over 22 years of experience with the C-130 aircraft and its inspections. And he was also involved in developing one of

the people involved in developing a maintenance inspection program for the C-130 when it was originally certificated, which I've left you gentlemen folder which have the type certificate in it for your review, and any questions you may have. And other than that we thought that we would just see if you folks had any questions along those lines or would like us to make any statements.

MR. : I guess you have the copy of the statement which I wrote, and I really didn't want to delve into all of the issues that have been hammered and hammered and hammered already.

MR. : We have copies of it.

MR. : We don't have the copy. We'll eventually have the copy.

MR. : There's five copies.

(Tape change)

MR. : -- is more or less a generalized term. Just here today, in what I've heard, to me it's overwhelming the amount of information in one day. I cannot imagine how you all are dealing with all of this information.

MR. : Not well (laughs.)

MR. : Our little industry is, kind of -- I wouldn't call it exactly a closed loop, but it's small, everybody knows everybody else, quite a few of the people that are involved in it today are more or less some of the founding fathers of the industry as a commercial operation.

MR. : The question had come up in Denver, gentlemen, about how the type certification is done, and I wanted to ensure you that it went through a complete process, which they attach a document to the flight certification sheet there. It shows you the limitations and things to the aircraft, as an air tanker, structurally speed-wise and different things, and those were developed through engineering data basically, just going through that process of flight testing.

MR. : Did they instrument the airplane and flight test it?

MR. : They instrumented it somewhat. That airplane was actually -- the retardant tanks -- this -- our aircraft had the retardant system and licensing and certification was done at Arrow Union Corporation in Chico, California. And they instrumented this aircraft -- the first aircraft, which was not our aircraft, it belonged to TBM Incorporated -- as they did that for some of the flight testing. But it flew approximately 50 hours in flight test.

MR. : I guess my question is sort of two fold. One is, under your restricted category certificate, the FAA told us that there should be no feature or characteristic

of the aircraft which makes it unsafe when operated under the limitation described for its intended use. Its intended use being its military use, in this situation. I was wondering how you are -- the industry monitors the use of the aircraft, in terms of being sure it's operated within its envelope. This is that study.

But the study that was done, and I'm trying to see if you know if there's any studies on C-130s, but this was a study done by the operating experiences of retardant bombers. During firefighting operations done in November of 1974, we're hoping to find somebody that knows the history of why NASA Langley -- how they got encouraged to do that, but one of the conclusions in there, in the study, essentially is that the severity of the maneuver load applications in both magnitude and frequency of recurrence is such that significant shortened structural life of the aircraft should be expected.

I don't know whether you -- it's not on the C-130, I don't know if anything's been done on the C-130, or how you deal with ensuring the structural life of the aircraft under the operational conditions of forest firefighting.

MR. : Well, in the particular case of the C-130, we're actually talking about an airplane that was designed from day one with low altitude, low speed aerial delivery in mind. That's why they constructed the airplane the way they did. The Air Force of course conducted, along with Lockheed at the time, using the YC-138 prototypes from 1954 through about 1958, determining what the loads were, determining what the flight envelopes should be, what the airplane's actually capable of doing and handling, safely.

Along in the late 1970s, the Air Force began to look at the A model Herc, and tried to make a determination of how much life is left in this thing. At that time, there were reports, that were generated through Lockheed and presented to the Air Force, showed that the critical element on the airplane was of course its center wing. The study showed that center wing problems on the C-130A could be expected to develop somewhere around the 11,000 hour time frame. When they generated that, they looked at what the aircraft's utilization was, they took into account pressurization cycles, variation of mission configurations and performance. And they also projected that approximately 19,000 hours would be the life limit for that center wing on the airplane.

So of course, in the crunch -- that budget crunch -- it wasn't practical for the Air Force to go out and procure as many aircraft as they wanted. They looked at the C-130 and they said well, what can we do about this problem. And they determined that the corrective action or the proactive action to be taken was a center wing rehabilitation program. In that center wing rehab program, selected airplanes were processed through program depot maintenance, the center wings were removed from the airplane, the lower skin panels were replaced, the lower forward naps (ph) bars were replaced. All four lower forward nap (ph) corner fittings were replaced, and the lower rainbow fittings were replaced, as it was determined that, being under tension, this was part of the airplane that was going to wear out first.

They determined after that action was taken, that the airplane should be good for about another 15,000 hours. A number of the airplanes that were received by the air tanker operators had not had center wing rehab accomplished on them. Of course this was something that the operators, and I don't think the Forest Service and I don't think anybody else realized at the time. So, unfortunately, I guess, a couple of these airplanes might have gotten out there. And we may, I must emphasize may, have seen the results of a lack of information that was available. The other aircraft, ours in particular, have all had the center wing rehab accomplished on them.

One airplane has only 1,600 hours on it since that was done, and the others little over 3,000. That leaves us with, based on the information we have at this time for us, I guess, a certain level of comfort, but that's not where we're stopping. The C-130 has an AD note out against it. It's a very rigorous AD note, it's very demanding. It's something that I think is seldom seen, if ever. In that, the manufacturer no longer supports the airplane. But that doesn't prevent the job from still being accomplished. We have contracted with engineering companies who are performing the DTA for us.

We've entered into, I guess, a pre-negotiation period with some NDT companies. We're looking at ultrasonic, anti-current (ph), and there's a new acoustic technology which Honeywell is on the fore front of. It was just announced only the eighth of September that it was available. We're pursuing three different inspection types of options. We believe very strongly in the airplane. We believe it's a good airplane. We believe it's well suited for the task. And we are dedicated to resolving the problem with that aircraft, and we think it would be adequately addressed. But it's going to take, again, I know that you're hearing this from everybody that steps up to the mike, and saying it takes money.

And it does. And how to recover those costs is part of the issue.

MR. : On Friday we sent a center wing up to Kent, Washington to an affiliate of Boeing, and they're going to -- in fact, they're starting on it today -- analyzing exactly how to accomplish a lot of these things, and of course, in our discussions with Lockheed and Warner Robbins Air Force base, Fritz mainly, you know there's no real fear or concern that the aircraft is still not a good aircraft, as long as it's maintained and inspected properly. And again that reverts back to the simple question of funding. To get off that subject (inaudible.)

MR. : Well, I guess, really to end the conversation on that, unless you want to have some questions you'd like to ask me that are specific, the fuel tanks on 747s don't explode for no reason, the vertical stabilizers don't come off of Airbuses for no reason, the wings don't fold up on C-130s for no reason. Doesn't mean that we condemn those aircraft on a permanent type of basis, and say we're going to use them any more. We go after the problem and fix it. Fix it right so it doesn't happen again.

MR. : Fritz (ph), what are the G limits on the 130s you operate?

FRITZ (?): The flight manual lists the maximum G loading at three. And that is assuming that there is a certain fuel load maintained in the wings, with a certain cargo load in the cargo compartment, in the case of air tanker, a C-130A air tanker

we're talking about 27,000 pounds, so somewhere between 12,000 and 14,000 pounds needs to be maintained to hold that three G limit.

MR. : Of fuel.

FRITZ (?): Of fuel. Once you drop below that, you basically come to a two and a half G limit. The flight manual is very specific, with some restrictions, advice more or less on the life of the airframe, which is, once you hit 10,000 pounds of fuel remaining, the airspeed is restricted to 180 knots, or --

MR. : No turbulence?

FRITZ (?): Yeah. No turbulence. Thunderstorm penetration speed, basically kind of, airspeeds. And 6,000 pounds is your recommended minimum landing fuel, to help conserve the structure of the airplane, extend its life. If these things are not followed, then it serves that something is going to go wrong, somewhere along the line in the airplane's life, being that airplanes never forget how they've been used, and when their envelopes have been exceeded.

MR. : Are you aware of any other aircraft that were manufactured by Lockheed they don't support?

FRITZ (?): Not unless you want to talk about Avega (ph). Lockheed's position, which, I guess if I put myself in their shoes I sort of understand -- they're out there to sell new airplanes. And unless there is some monetary reason that would drive them to support the older airplanes, I can see why it's a matter of economics.

MR. : Lockheed has not totally turned off of the airplanes. What they're basically saying, it's the same with the P3, that they just don't -- that airplane's not in their manufacture any more. They have been very helpful, I mean, Fritz (ph) talks to Lockheed, but basically they've gone on to an updated aircraft. And there's a lot of stuff they claim when these airplanes are built for the military, the information's turned over to the military, and at that point they try to wash their hands of any of that old, you know, any equipment.

MR. : That's worth making a point, though, isn't it? Not all aircraft have the data package turned over to the military. Lockheed retained it in some cases, but on the 130As, it was turned over to the Air Force.

FRITZ (?): Well, the position that Lockheed took with it was, they told the Air Force that they really no longer wanted to support the airplane. Now there really wasn't very high numbers of the thing being used any more in the first place, and that if the Air Force wanted to continue to use the airplane, that here, it's yours, here's all of the engineering data on it, you take it and you go with it. And the Air Force did that. Until they decided to retire them. And I think one of the key issues when we're talking about the retirement of military airplanes, why was it retired?

In the case of the C-130A, after you've spent the million and a half dollars rehabilitating the center wing on it, it goes to the boneyard after 404 hours. There's

other economic driving factors in it. And of course, at the time that they were able to begin to retire the C-130A, the H models were going to Air National Guard reserve units in pretty fair numbers. And that was the whole idea.

MR. : The military is still running the C-130A. Fritz was just at Point Magoo in California last week and the week before, where they're also doing the wing structure analysis on the Navy's C-130As, that they're still operating. So they're still using them. They used them for gunships up until about --

FRITZ (?): About three years ago.

MR. : Three years ago.

FRITZ (?): The last Air Force C-130A to go was serial number 550022, which was used as a floor test bed, it was based out in Florida. They just retired that airplane in the last 18 months.

MR. : Did the engineering package find its way to the operators?

FRITZ (?): Negative. We have made requests for stress analysis data, the kind of things that we knew exist, some -- we used the Freedom of Information Act to try to obtain it. We sent that request to Warner Robbins, the request was denied. We were allowed an appeal, we appealed it. It was denied again. And the basis for the denial was that it contained information which was proprietary to Lockheed. Which left us wondering how that could be if Lockheed turns everything over to the Air Force and says it's your airplane, and should that information not now be public information, available to anyone.

I don't think it was a case of somebody was planning on going out and building brand new C-130As to compete against the (inaudible.)

MR. : And you all made that point in your submission? Freedom of Information submission?

FRITZ (?): Yes, we did. We had an engineer, we still use him, he was an Air Force engineer, he worked on the C-130A model, part of that program as well as some of the other C-130 structural programs. He was there at Warner Robbins, he's now retired. But he was our point because he was there, and able to make contact with the people….

MR. : And who were they sent to?

FRITZ: I believe they were sent to the legal office at Warner Robbins.

MR. : Get a copy of that (off mike) --

FRITZ: Well, it kind of opens Pandora's box in that we know there is the existence of a lot of reports that were generated for this aircraft. There's a lot of technical data on this aircraft. There are structural analysis reports showing single

critical crack lengths, the crack growth curves for these areas and we I guess, to I don't know how to put it, other than we don't have free and easy access to the information because it's considered proprietary.

MR. : Have you spoken with the NTSB about this? If they're investigating this, they may have the ability to access information.

FRITZ: Mr. Peterson is aware, and I would like to emphasize that all channels of information are not cut off. We are able to access information, and we've been able to get some of those things and that information has been very helpful. The problem is when we go and get a piece of information from someone, we have to be very careful what we do with that information and how we say we obtained it.

MR. : Lockheed's a fine company, but their economic incentive obviously, as they do a lot of business with the United States government, and certainly the military could require that information be produced.

MR. : I think the water's been polluted, has it not, by the way 130s came, operators were misused a long time ago, is that still why the Air Force has --

FRITZ (?): I don't think that that was the issue at the time. At the time that these airplanes, the C-130s in particular were being tanked, when, as an example, Arrow Union wanted to obtain some of the same information, all of this cloud that now hangs over the exchange program in airplanes didn't exist.

MR. : Well, you're obviously very knowledgeable about the aircraft, and I appreciate you all.

MR. : Can I slip a question in?

MR. : No. Yes, go ahead.

MR. : Can I slip a question in (laughs.)

MR. : (Off mike.) I'd be curious as to what (inaudible)

MR. : And how does it differ from what everybody else is proposing?

FRITZ (?): Well, I believe, since I was on the working group that wrote the IPG-182, which is the Inspection Planning Guide for the Lockheed model 182 which was accepted by the Long Beach ACO as one of the two methods to develop and improve inspection programs from. The military Dash-6 being one, the IPG being the other. And I also, with the help of someone who writes very well, wrote the inspection program for our company. And even after I left the IPG-182, believing it was adequate, in that it ensured air worthiness for the airplane through the inspection programs, there was other things that I felt, just to give ourselves the extra level of comfort, that we would do.

And we built some of things in to our program, and actually now, because it's been about eight years since I wrote that program, I would have a very difficult time without sitting the two programs side by side, the IPG and ours, to determine what it is we do exactly what the other ones don't. But we do go further than the FAA requirement was.

MR. : Dunn (ph) enhanced it, and more in-depth electronic, ultrasound and x-ray our wing sections every winter (ph). We not only have done it on our C-130s, we do it on our DC-7 air tanker, even though that doesn't have any concern, basically.

MR. : When was the Fire Service aware of the information you just gave us -- retrofit?

FRITZ (?): I'm not sure of when they became aware of that information. I believe that they are very well aware of it now.

MR. : The report was dated when?

FRITZ (?): Well, the Lockheed report was dated about 1978, or '77, '78.

MR. : The other thing, Jim, back to your question on this G-meter installation, which you've got a copy of on the DC-6B. Those meters were installed in several different types of air tankers, not just the DC-6B. They were done in the S2, for the State of California division of forestry. They had them in them, Glebe, a couple of our C-119s had them in them, and various other air tankers, that was done through NASA. At the time it was done, the reason that I remember it being accomplished was the fact that we had had a couple of S2 accidents, and the concern was the G loading, and so NASA agreed to come out and install these boxes and take the readings and keep the meters in so the California Division of Forestry should actually have a record of that, and the Forest Service should have more records than they've evidently found on that program.

I was involved quite heavily in the Air Tanker Industry Association at that time, and it was quite an in-depth project.

MR. : What was the result? Any impact on the contracting?

MR. : Well, the results were, the best I could remember, were that none of the aircraft met any favorable G loading situation. So basically, it came out, a gentleman named Joe Jewell (ph), who was the doctor in charge of the NASA side of the project, read the statements at a meeting, read the results, the agencies didn't like what they heard, so at that point it got shelved or put in storage and that was basically the end of that deal. The G loading on the S2 was way more than --

MR. : That might be what happens to the Blue Ribbon Panel, too.

MR. : It could be. That's why I'm telling you now, so make copies of what you guys are going to do before you turn it in.

MR. : That's proprietary to our --

(Laughter.)

MR. : Anyway, that's what went on. The results weren't favorable, so it just went away.

MR. : How would you explain that? Why did they determine it wasn't favorable, just because they wanted to be able to operate them at a higher G loading --

MR. : They wanted to continue to operate the equipment, and continue the programs, and in all fairness I don't believe them or us knew exactly how to correct the situation. So I mean, what do you do, it was just, everybody's concerned I guess, I'm sure there were statements made, don't make quite as steep turns or approaches or something like this, and try not to pull back as hard or something. You know, there was really nothing methodical that developed as a result of it. It basically got shelved.

MR. : Any other questions?

MR. : Yeah. I'm probably a little bit slow here, but I am still not clear upon what's done in giving you, or anyone, the restricted category type certificate for the airplane? I understand that it's more or less certified or certificated to continue doing what it was built for originally.

MR. : Our specific purposes -- it's certificated for specific uses. Which are along the lines of its military usage criteria, what it was developed for. In part 25-125, I believe, the FARs, is, I believe, is a section -- deals with ex-military aircraft, and it says, in that part of the federal aviation regulation that if an aircraft has a proven military history of operation, doing certain types of work, it can be licensed in accordance with that proven historical operation, with a civilian license.

MR. : On the type certificate data sheet, which has been included with that package, I think it's towards the back, it gives you the certification basis for the airplane, or it's on the front, I can't remember which, it's in one of those pages there.

MR. : This is FAR 21.25?

MR. : Yes, 21.25, I'm sorry.

MR. : The data requirements that we got from the FAA in a briefing there, included instructions for continued air worthiness for the aircraft, its engines and appliances, it was supposed to be turned over.

MR. : Yeah, now in that case, what they did is they turned over the technical orders -- the TOs -- to the airplanes, the structural air manuals, your engine manuals, propeller manuals, electrical manuals, all those kinds of service maintenance manuals. And I suppose that it could've been determined that that was what was needed to ensure continued air worthiness. It included thing like dash six inspection program

MR. : Which was a military inspection program? Which we have tried to follow pretty closely --

MR. : I'm kind of curious about, and I'm (off mike.) I meant to ask that, but go ahead and finish, I've got a question I want to --

MR. : Well, I'm still having trouble understanding, because we're hearing from some people that the fire suppressing use of the aircraft is so similar to the original melter (ph) used, you don't have to do anything much different. And other people are saying, no, really the airplane is being operated on quite a different sort of mission profile, and the maintenance schedules and inspections need to be adjusted to that new profile. And what I haven't been able to understand is how anyone determines what that change in maintenance and inspection needs to be to fit the new profile and give you the assurance that the airplane is as safe now as it was when it was originally used for what it was originally designed for.

MR. : I understand that. And I guess the answer is that since none of the airplanes have been outfitted with what we call current technology recording devices, we can only work off of assumptions and math, so --

MR. : Does the contract pricing, then, force you not to do what you would want to do to assure yourselves that the airplanes could be operated?

MR. : It doesn't to us. We've included those costs in our pricing, and we don't have jobs for that reason with the U.S. Forest Service.

MR. : We believe that, you know, we've done what we felt was appropriate, based on our operating experience, and the experience of our people, and experience with the aircraft -- that we took the steps that were necessary to ensure continued air worthiness. And when we turned in our bids, it reflected what it cost to actually conduct business that way, they were rejected as too high.

MR. : About what does that add? Can you indicate roughly, either by season or by --

MR. : I think our maintenance costs are probably somewhere close 12 to 15 percent higher than anybody else's.

MR. : That's cheap.

MR. : The Federal Aviation Administration, when they got this certificate here which you all got, the restricted certificate on these 130s that were turned over. This says 1990, I guess is that when it was --

MR. : That's when that aircraft was licensed

MR. : This particular aircraft. Was that to you?

MR. : Yes, sir.

MR. : Was that one of these aircraft that went from the Air Force to the museum and then to you? It says here that in giving that certificate that they should have evaluated the aircraft type's military safety record, which I guess would include the information on the wings needing to be rebuilt.

MR. : Well, the service history of the C-138 from a military perspective was actually pretty good. When you look at the number of airplanes that were built, I think it was somewhere around 225 C-130As, there would be a difference of opinions -- for lack of a better term -- from people who will say the airplane was a terrible airplane. It always had structural problems, and the fact is those statements are just not true. I think you'd be very hard pressed if you investigated the service life of the C-130A to find where that airplane ever had a structural failure which resulted in loss of the aircraft and crew, other than in combat situations and the situation that we saw this last summer, as well as the possible Pear Blossom loss in '94.

MR. : Well, I guess my point is, do you think the FAA should have been aware of the information that Lockheed generated in 1978?

MR. : Well, I guess I don't know how they could have been.

MR. : Unless Lockheed would've given it to the FAA.

MR. : Unless Lockheed would've stood up and said hey, there's some things --

MR. : And why did the Air Force not turn that information over to you? Did they think those airplanes weren't going to be used in flight?

MR. : I think they understood very well what the airplanes were --

MR. : I don't know, I'm just trying -- but know that the FAA has -- does the FAA now have that information?

MR. : Yes they do.

MR. : Has that been reflected in any of the current orders, or anything going on?

MR. : Yes. I'd have to say yes, definitely. The FAA has been very helpful to those of us who are working on resolving this issue with the AD note and very forthcoming with the information, both in the NTSB reports and with the information that they've been able to gather from the Air Force and I think it's unfortunate that it would appear, at least on the surface, that the loss of this airplane last summer has maybe, partially, broken the log jam.

MR. : The log jam from --

MR. : I would have to call it from the legal folks on the Air Force side of the house. The technical people on the Air Force side of the house --

MR. : So the Air Force is given the information -- now the FAA that they get before?

MR. : Yes. Yes. And I would like to emphasize that the people who work the technical side of the house were never an obstacle and were always very helpful to us.

MR. : Well, everybody that's paid by the taxpayers ought to be helpful when it comes to safety. I think that's good but that's also their job. I don't have any other questions. Bill? Jim?

Thanks again for coming and obviously very knowledgeable and we appreciate you being back again. And if there's any other information that you think would be important for us to have, would you please get it to Al, because we're on a short fuse now in terms of putting our findings out.

MR. : I just hope you don't get swept under the floor.

MR. : Oh, we won't sweep it under the floor.

MR. : No. I know. Thank you.

MR. : Is there anyone else who'd like to sign in to speak to the panel before I call on (off mike).

MR. : I have a quick comment for the panel. We were in Sacramento to hear NASA Ames present their surveillance program that they developed and demonstrated to the Forestry (inaudible) so you can look forward to hearing that. They took I.R. photos from the air and sent them to the ground -- geo-rectified the image and put it on the map. That's already been done and I will explain that data.

MR. : News to me. If they're going to be presented, they'd better get hold of it because the day is pretty full already. You've got a colleague you need to get hold of him --

MR. : I told him how.

MR. : (Inaudible.) Mike?

MR. : You want to take a break or --

MR. : No.

MR. : I wouldn't mind taking a five minute break. Just a quick one or otherwise --

(Break.)

MR. : It really is kind of an operational question and it's what are the circumstances under which a scooper aircraft makes sense?

MR. : One, you have to have water.

MR. : Yeah. Okay. I understand that.

MR. : You have to have what we would call "scooperable" water which could be a reservoir, a lake, a river. Something we could get an airplane in and out of. We need approximately a mile for the approach, the scoop and the departure. The Great Lakes states -- I mean Minnesota's state motto is the "land of 10,000 lakes." It's well suited. That's where we currently work. The Great Lakes state lend themselves well to scooping operations as do some of the states in what we call Region 8 in the Forest Service in the south-east, from Virginia on down to Florida and over as far west as Arkansas, maybe into Texas. I'm not sure if Texas is in the eight.

Southern California has some potential. Areas like Nevada, Arizona, parts of Wyoming, the potential's very limited there. Pretty arid states and not a lot of water where we typically have fires.

MR. : What kind of depth do you need?

MR. : I think the minimum depth for scooping is around four feet but I don't think we would attempt it. I think we're looking for water that's in the 10 foot and deeper area. And most of the lakes we've been working in, of course, are quite a bit deeper than that.

MR. : And if you've got a short turnaround from the source to the fire, is it reasonably effective compared with using retardant?

MR. : It's reasonably effective because we can keep the thing wet constantly. Depending on the distance to the fire -- I have personally made two minute turnarounds to the fire where every two minutes I was putting a load on the fire. We're kind of like a large helicopter in that respect. Locate the helicopter near the water source that's near the fire, the number of gallons per hour or per unit measure however you choose to do it is way up there. The retardant based airplane which we operate also has to go back, land, reload and come back. That's not all bad because retardant has some staying power. Want to rebuild line with retardant and put it down. Water, by itself, is not real effective if you can't keep it coming, if you don't have people on the ground to back it up.

So both retardant and water are effective if you use them properly. And so, if the scooper has water within a reasonable distance of the fire, he can be very effective. We mix -- we have foam injection systems and then we mix foam with our water and I would guess that probably most of the time that's the request. We work for the fellow on the ground -- the man or the woman on the ground who's in charge of the firefighting -- the fire IC, or the fire incident commander. So we work for them

and if they've requested that we make foam drops, we make foam drops. If they request, for some reason, we make straight water runs.

MR. : Do you put the water right on the fire?

MR. : Usually we do. Yes. That's kind of a difference in the tactics too of the scooper. We go into more of what they call a direct attack mode where we actually go and try to put the water on the flames. With the retardant airplane, we can do that but in sustained firefighting operations most often we're building line with the retardant airplane.

MR. : What's the furthest distance that you feel like you can effectively use one of these planes?

MR. : Well, that question is a good question and there's some variables to it. If you only have one scooper available, if you get out there to the 15 mile mark or so, your results may become marginal. If you have multiple scoopers on the fire to where the time that they're actually at the fire is kind of continuous because of a daisy chain kind of effort, that distance can increase somewhat. Maybe up to 20 or 25 miles.

In the Canada area there are a series of scoopers. There's three models of the scooper. There's a CL-215 which is really good. It's the first model that was produced from 1970 through to 1988 or '89 and it's powered by a pair of Pratt and Whitney R2800 radial engines. And they converted that airplane, in some cases to a 215T where they put large Pratt and Whitney turbo prop engines on it and after they had done a large number of them -- I think they did 17 or 18 of those -- they went into full production with a production airplane called the 415. The 415 and the 215T are considerably faster. They're about 30 knots faster than the straight 215. So, if it's a turbine powered airplane, the distance from the fire to the water source could be a little greater and still have the same effectiveness as a 215 and a closer water source -- working from a closer water source.

MR. : Sounds like they typically work at low altitude too, do they not? Just from the areas you've talked about, at least in the U.S. Do they use them in the mountains anywhere?

MR. : Yes.

MR. : Okay. So, at least the 415 probably and maybe the 215T, has the performance to do the job in a high and hot condition.

MR. : And we actually did pretty well with them last summer with the 215s in the state of Washington. We were in the mountains in some very rugged terrain, north of Wenatchee, up around Lake Chelan, if you're familiar with the area. It's very steep rugged country and we worked in there with the 215s without any problems.

MR. : Well, that Canadair product aside, I think you're saying that the concept of a scooper makes sense in the mix of things that are used to suppress fires?

MR. : Yes. It does provided that there's adequate water within a reasonable distance. Without that -- you know with the retardant planes we often go great distances, maybe three hundred, two hundred miles to a fire sometimes. That type of distance with straight water is impractical. Wouldn't even be worth the effort it took to launch the airplane basically. So we have to have the water source in reasonable proximity to where the fire is. In the north-west -- Washington, Oregon, a large part of California -- the Great Lakes states and the south-eastern United States in a lot of cases there are abundant sources of water for us to work with.

MR. : Have you looked at the BE-200 math? I'd like to know what you think of --

MR. : I'm aware of the BE-200. I've never seen one.

MR. : They can go either as a scooper or a retardant carrier.

MR. : Right.

MR. : Does that sound like a good plan, or not?

MR. : Well, we can carry retardant in our scoopers also. There's nothing that prevents us from doing it except that right now the scooper -- the CL215- 415 series does not have an IAB, Interagency Air Tanker Board, approval to carry fire retardant, but the tanks could be brought into compliance to do but I'm not sure how practical it is. The airplanes really don't carry large volumes. Their large volume capability comes from their quick turnarounds from the water source. And the BE-200, all I know is that I have a little bit of research done on that. I don't think that they have full certification on that aircraft yet.

The information that I have from some contacts I have in Europe suggest that there are two of them that fly. There are six or seven of them they're trying to get through production and that they've enlisted the aid of the European consortium that builds airbuses to try to help with final certification and the implementation of Rolls Royce engines on those aircraft. The price of those planes, right now, supposedly is about $20 million or $25 million. By the time they get through with airbus and Rolls Royce it would be interesting to see if that price holds and they also say that they can carry cargo, passengers, scoop water, carry retardant. It's a one size fits all airplane.

And historically, and Bill Waltman alluded to it a little bit earlier, but we have done multiple roles with the same airplane at times but, usually, what my experience has been with that is if they want you to be a passenger carrying airplane, or they want you to be a cargo carrying airplane, there's also fires burning and they need you as an air tanker. I mean the DC-4s that we operate are cargo capable. We used to have air tanker contracts written where we had to carry some cargo in part of our contract. The problem was when the cargo needed to be carried, the fire cargo that needed to be carried, they needed in a greater capacity as an air tanker than they did as a freighter.

They could pick up the phone and dial 1800 somebody and get a freighter. Air tankers were in somewhat limited supply and that's where the priority was. So I don't know if that answers your question about the BE-200. I'm aware of it and from what I can gather, it's a ways off from certification and I think if someone wants to use it, they're going to have to decide how they want to use. It's probably going to be a single role airplane by the time it gets right down to it. And that's an opinion.

MR. : -- May I offer a comment? One of my NASA colleagues just traveled to Russia to a conference they were having on airplanes of this sort. They had the BE-200 there. They have used it to dump water but never (inaudible.) It's just see, it dumps water. See, there you are. It's also turbo fan-powered (ph), so it's not going to be as efficient as those (inaudible) turbo props.

MR. : We had a presentation from the U.S. representatives for them so we know about the airplane. I was just interested in the operator viewpoint. Thanks.

MR. : I appreciate you very much coming back up. It was a little bit off the wall after everything else this morning. But it was useful, and my colleague -- did you get what you wanted in terms of a good perspective?

MR. : Yeah. Yeah.

MR. : Thank you.

MR. : You're welcome.

MIKE LANHAM (ph): I can talk this time. Remember Salt Lake, I wasn't feeling very well. Just to reintroduce myself. My name is Mike Lanham with the Bureau of Land Management. I'm based in Lancaster, California. Again, my experience and background is from the air tanker industry. I was a tanker captain for 14 years and then I joined the Forest Service and became a lead plane pilot and then shortly after that I also joined the BLM and became a lead plane pilot/air tactical pilot in the AS Emro (ph). Also at the podium here in Ken Perry (ph). He's the air attack officer that flies with me in the ASM (ph) unit and Cliff Nouveau (ph) who has a background with the Forest Service in the lead plan program and the ASM.

The last thing that I talked to you the unit was -- I actually just came up to answer -- wanted to clarify actually a couple of things that Leland Snow's (ph) daughter gave you on coverage levels and computerized drop systems and differences between their tank system and the 130 and you started asking a lot of important questions, so I never really got to that point. Actually, at this time I don't think it's relevant to clarify those points but I did try and get across to you that I wanted to talk you probably about something that I don't think has been talked to you about before.

A lot of people are explaining a lot of theories on fighting fire with new aircraft and helicopters and so forth and there is a lot of good sale pitches out there but I think, if you remember, I gave you an analogy about what I think the problems. And that analogy, once again, is just pretend that you're doctors and you have a patient that comes into your office and that patient is sick and has some type of

illness. You, as a doctor, can treat the symptoms and make that patient well. But what made that person sick? The analogy being here that that person that is sick or ill could be our predicament that we're in today.

Yourself and management is the doctor and you look at those symptoms and you try and fix it. But what caused that illness in the first place? And that's what I want to kind of get at today. Before I get into that, one other thing, if you remember I gave you a promise that I would provide you with some information to help you gain knowledge about aerial firefighting and ground firefighting in general. I placed the CD in each one of your areas there that deals with that. It's in the white cover. There's also a CD there deals with lead plane flying and basically the ASM program with the BLM. I think you'll find those CDs very instructional to you.

I also have a handout that I'll give to you shortly but I want to start off with just a little bit of history about the Forest Service aviation. I have a little bit of background with the BLM aviation but not too many people really hold that corporate knowledge about BLM aviation. So I'm going to speak about Forest Service aviation. We're going to go back to the late 50s and there was a gentleman by the name of Monty Pearce (ph) and almost everyone that I interviewed basically coined the phrase that Monty Pearce was the father of Forest Service aviation.

He did things like create regional aviation units, regional aviation officers. He set up the national aviation positions that we now have today. He also brought in what basically now is the Interagency Air Tanker Board. He specified under the Air Tanker Board, as it was called then, performed specs, gating systems. He also set up age limits on air tankers and at that time the DC-4 fell out of the age limit. It wasn't a viable air tanker. Since that time it has changed.

The time period that Monty Pearce was in was again from the 50s until 1975 when he retired. And I'm going to give you dates about some of the other gentlemen here and this is what's important and I hope you follow on with. After Monty Pearce in 1975 there was a gentleman by the name of Earl Keegan (ph). Both Monty Pearce and Earl Keegan were extremely educated and had a wide background in aviation. Both of them were pilots, Monty being a smoker jumper pilot. He owned a full plane operation in Washington. Earl Keegan had a Navy background and came from the FAA division of airports.

Earl Keegan was in from 1975 until the early 1987 era. Under Earl Keegan, probably some of the most important things that happened under his rule, there was a gentleman by the name of Ken Alderman (ph) who brought in the Barron fleet that we now have for lead planes in the Forest Service. He was basically the technical advisor in aviation. There was another gentleman by the name of Bill Monroe (ph) that ran the administration part of it. And in Salt Lake you guys were talking about the helicopter manager positions. There was a study done under Bill Monroe called "Alternative 4B" and that's where the helicopter coordinator came from. That was in 1972. And again, that position came about because of high accident rates.

So, again, we have Mr. Pearce, almost 20 years of services. Earl Keegan, 1975 to 1987. In between Earl Keegan and a gentleman by the name of Fred Fox, Bill

Monroe was acting and today in this audience is Fred Fox. Fred was one of the next managers in the national office and, Fred, correct me if I'm wrong, but Fred was a north zone aviation officer. He was regional aviation officer and I believe he was the only national aviation officer in Washington D.C. that was a lead plane pilot. Is that correct? Thank you.

Again, Fred, correct me if I'm wrong, you held the positions from 1987 to the 90s. After Fred there was a gentleman by the name of John Chambers. His background, unlike all the other people that held the position, did not have an aviation background. His was more of a ground firefighter background. He was a good manager but his position was only held from 1992 to 1995. After Mr. Chambers, he retired, there was a Mr. Pat Kelly, again non-pilot. He was brought in from '95 to '97. After Mr. Kelly, Bob Martin from '97 to '00 and presently we have Tony Curran (ph).

If you look -- and I'll hand these out to you -- and you look through this information again you're going to see that the first three gentlemen were in these aviation positions for long periods of time. They have aviation background. They had great technical expertise in aviation. As we come into the later years here we start to see a decline in these fellows having these positions for only very short periods of time. In fact, we've coined a phrase on the field that these are the high three years. Only after three years these gentlemen were gone and never heard from again.

There is a period of time just shortly and, again, in '97 to '00 where aviation really started its decline and that decline was in the dismantling and demolishment (ph) of the lead plane program and also there was a great effort, I believe, by this manager to also abolish the air tanker program and I'll get into why I feel like this. The use of aircraft and natural resource management can, like I said, be traced back almost to the 20s. We had Curtis-Wright that were brought in. These were aircraft that were brought in for aerial surveillance.

After World War II we started getting into larger aircraft -- B17s, B25s. We got into the four Ys and the C119s. Again, the history of these first few gentlemen plays back into the 50s and the 60s. This was the heyday of aviation in the Forest Service. We had great strides in this new aircraft come along. Aircraft coming back from World War II. We had strides in management. Alternative 4B. We had national programs, national contracting. Actually, the contracts years ago were only regional contracts. They actually district rangers that said I want an aircraft in my area to fight forest fires. And they would actually contract with local area fire fighters that had this equipment.

Monty Pearce did change that and brought it into the national perspective because a lot of the air tankers weren't allowed to outside the regional boundaries. If you look at some of the old photographs you'll see tankers with numbers like B24, Baker Charlie 30. Those were the regions that they actually worked in. Now you see numbers like 123, 124 and 130 and that's because of the national program. And these are the kinds of things that these early managers did. They brought up new contracting, new ideas. It was the heyday.

But now that we get back into these years -- I'm going to call them the high three years -- where gentlemen would come in for short periods of time, we start to see a lack of expertise, knowledge and I think, care, about the aviation management program. When we start to see the decline again, I think, of the aviation program because of the some managers (inaudible) in here and these people leaving and coming and going at high rates of speed, you start to see people being brought in from the field that basically have a helicopter background. These people from the helicopter background that now are starting to hold these positions -- what do they think? They think helicopters are the ones that are going to save the day. And that's why you see a lot of heavy use of helicopters now and overuse. You don't see hardly any fixed wing people in management today.

Some of these managers also that are being brought in to positions today with not actually having expertise, they are knowledgeable in some areas and I know some of you have military background, some corporate background, but answer this question for me in the military sense of it: Had you (inaudible) I know you're a military, did you ever see a time where any of the safety officers were wing commanders? Did you ever see wing commanders that were pure safety officers? Why is that?

MR. : Because the pilots always got the job.

MR. : Well, to me, where I've learned aviation and some of the management skills that I do hold -- and I'm not an expert -- if you have safety that runs operations, basically the best way for safety to run their operation is for everybody to sit still and not do anything and you have a great safety record. If operations run safety, it goes just the opposite. You've got pilots in their maybe running the operations and you've got things that can really go amok and high accident rates.

So you need to have a good manager to run both operations, managers and the safety side of things. I'm sure you all know this. But what's happened here in the later years we start to see again people with the knowledge and skill in aviation start to leave. People that are running programs are either in safety or have a helicopter management background but no aviation experience. And so safety is actually starting to run the operations in the Forest Service. And I can name names and I'm not trying to blame anybody here and in this information, in fact, very few names are mentioned in here. But what has happened is safety has started to run Forest Service aviation and it's brought it to a standstill.

It's easier, for instance, in the lead program -- several years ago, about three years ago -- it was easier for management to try and demolish the lead plane program. Get rid of the pilots and the program than to manage it. They had no skill, knowledge or expertise to help manage their program. So it was easier for them just to get rid of it. And actually, if it wasn't for a couple of people intercepting some memorandums that the lead plan program and the people that were helping to run it -- there was actually no leadership -- was a concerted effort to stop that demolishment (ph). So that's where we're at today.

That's where I think the crux of the problems that we have today in aviation. And you can say that we need new airplanes, we need better maintenance, we need more money, but unless you have the managers that are willing to give the care and attention to the program and have the expertise to (inaudible) everything that we're talking about is nothing, it's nil. And you're going to still have the same problems that we have today in the next decade.

MR. : All right, are we going to hear from you other gentlemen?

MR. : Just here supporting him. If you've got any questions on basically the culture I guess that is one of our concerns, is the brief period you're given for your findings is that you understand the culture and why we are here, you know, what got us here. And I think you are starting to see some fairly complex situations. But it really is a culture. It has parallels to military and it has parallels to a lot of other things, but it's fairly unique in a lot of its endeavors. I think that's what important to us that have been in the business for a long time, that I think if you understand that then you'll be able to maybe address some of the problems.

MR. : If I could be permitted, a lot of the top meetings have gone into the cultural aspect, and (inaudible) talked an awful lot about those. It's the difference between the more highly centralized BLM interior approach to managing and running the aviation program versus the much more highly decentralized approach used by the Forest Service. Since you've been on both sides of the fence, I'd be interested in your reaction to that.

MR. : Actually I was on one side more than the other and I'm still learning a lot about the BLM. But probably the main difference between the BLM and the Forest Service as far as management is concerned is it's a much smaller entity. The Forest Service is huge, you have regions, you have regional aviation officers. Well, the BLM has something very similar to it in state FMOs, and we have state aviation managers. But the programs are much smaller and they're much easier to deal with on a one-to-one basis.

One of the greatest things that I noticed when I did switch over to the BLM was that I now had a very close relationship and contact with my state fire management officer. And there was delegation of authority to me to help make decisions, either in our office in Lancaster or in Boise, because of the expertise and knowledge that I had that he didn't have. And that's one thing that I do see lacking in the Forest Service is people being able to ask questions if they don't have the knowledge.

And, Ken, if you don't mind, would you hand these out to these gentlemen? I'd like to show you one little thing I have in the very back page. In the back page, the very last page, this is a portion of a letter that I sent to Tony Curran (ph) and a gentleman by the name of Bob Roth (ph). I had a time when Tony was the national safety officer and Mr. Roth was in charge of human aided technology. And this is at the period when the lead plane program was quite in jeopardy.

But on the very back page you'll see kind of a little matrix. And actually the last two pages deal with successful team work. And if you just bear with me and go through this matrix with me. If you look in the lower right-hand corner, you have a task and a goal and hopefully you finish your accomplishment. But in order to do that, leadership, management -- and we'll take Forest Service aviation in particular -- that management needs to have knowledge. They have to be truthful, they have to disclose, they have to have authority, they have to have attention to what the project is. And most importantly there's a responsibility and accountable for what's going to happen.

So now you have the team management and they have an idea. They have a program that they want to initiate. There needs to be a great effort between the team field personnel that are actually going to help implement the program, between the team management. There needs to be an attitude, a behavior and a knowledge and a cultural philosophy between these two management teams, one being the one that's going to do the work and the other one that's going to help guide them.

Once the team applies the leadership and they are acceptable to their employees, they can cause cooperation, cause coordination, efficiency productivity, show respect, growth of character and share rewards. In all instances that I've seen of Forest Service aviation, where they lack is at the top. They lack a knowledge. Many times in the lead plane instance they were untruthful. They actually lied to many, many people and said there's nothing going on with the program, and until we actually saw memos to counter that that had actually come out. They need to disclose what's going on in the Washington office. People need to have knowledge not only in management, but also in the field. And, again, when something goes wrong, there's no responsibility or accountability. And usually by the end of that time that they are in that position for two to three years, they're gone and the responsibility is handed off to the next person.

So, again, with the analogy that I gave you, hopefully that -- and I've discussed this many times with people in the field. I've talked to Tony Curran about this. I've asked them to come out in the field and get experience. He is -- to me, I think he's a brilliant man. He has quite an aviation background. I mean, I can listen to him for hours and hours. He's a good salesman as well. But one thing that he does lack, and he agrees with this when I have talked to him, he has no knowledge about aerial firefighting. I've asked him countless times over the last three years to please come out in the field, I'll demonstrate to you either through training or actually get you on our fires what we do out there with helicopters, leads and air tankers.

The only time that I did get him out in the field was at a training session and it really wasn't a good environment for him to be in, because I think I told you once before you need to have the dynamics of the actual smoke and fire, communications going on and actually to see what's going on. So in the training session that we did, we purposely made sure that it was mundane, easy and we scared the living shit out of him. I promised I wouldn't say a profanity, but that just slipped out. So sorry.

He was overwhelmed with the complexity that we have out there. He was overwhelmed at the maneuvers that we had to make in order to get the job done. And,

again, I picked flat area terrains for him to be maneuvered into. Again, no smoke or no fire. So it's imperative for these managers to have that type of experience in order for them to manage the resource out there. And, again, that's why I've given you that CD in order for you to help gain some knowledge.

You'll find in the CD that's black, if you look inside -- I'm sorry, it's the one in the white cover. I think there is approximately 40 to 50 PowerPoint presentations that deal anywhere from tank systems to lead plane programs to air attacks, different types of retardants, helicopter types, and there's also some lesson plans in there. So actually you have about a week's worth of training on that CD, so good luck.

With that, if you have any additional questions, I'd be happy to answer them.

MR. : I do, Mike. You gave a pretty good rundown on what happened during the high three years there -- high three period. At that time, both in corporate America and within government, everybody was convinced that so-called professional managers could manage anything. It didn't matter if you had any background in the field, that was just kind of the given tenet of the time, if you will. Would you say that the Forest Service has abandoned that, or do they still live by that? I mean, the fact that Tony is in there now with at least an aviation background, I want to know how you assess it.

MIKE (?): Well, actually I have great hopes in Tony, although I have seen some things that I disagree with him on. But he's one person that -- I think since back in the early years, he's one person that we're able to actually have contact with. I mean, I shoot e-mails to him and talk to him on the phone on a regular basis.

MR. : Yeah, but he's still one person.

MIKE (?): He's one person, but --

MR. : Does this professional management cadre still exist --

MIKE (?): I think so.

MR. : -- within the Forest Service?

MIKE (?): And for him then to deal with his superiors, I think this problem that I see that exists actually goes a little farther up the chain, and you have people that are really brought on because of political reasons or some other -- I don't know, I'm not sure. But they fail to I think have a responsibility and accountability. Again, like I said, Tony in -- I think one of the greatest things he's done in the time that he's been in management has been this panel that's existing today. I think that's probably one of the greatest things that he's done so far. But now he was in a safety position and there was a gentleman that was in the Washington office, and when that gentleman left -- or was not able to manage because of some other reasons, again Tony was brought in to help solve problems and run operations. So, again, he was part of the problem at the time, but I don't think he was at fault. It was just he got caught up in it.

Now, this is not only at the national level. I can bring it down to the regional level. There's only one regional aviation officer today that is lead plane qualified, that has any idea what the lead plane program is like. There are good managers that are at the regional level and they are relying on people to give them expertise. But the same problems exist there. Once you have achieved enough time in the Forest Service to get to those positions, you're ready for retirement and you're out the door. There are some exceptions.

AL HYDE (?): Any other questions for the panel? I'm proposing a short 10 minute break and then we'll come back and see if anyone else wants to come up and --

MR. : Are we going to hear from Fred?

Fred, are you going to come up here? You've got lots of knowledge.

AL HYDE (?): Let me see if I can twist his arm.

MR. : Well, we all need to be prepared. None of us are prepared.

MIKE (?): Al, guess what? I'm not done yet.

AL HYDE (?): Well, actually you will be in 10 minutes. Go ahead.

MIKE (?): Just real quickly. I heard a couple of comments this morning from the gentlemen that were talking about the A-10, and they were good presentations. One thing that I want to leave you with, and I think in the little handout that I gave you, I gave you a quick glimpse at it, is any aircraft that you look at to drop retardant has to meet criteria by the Air Tanker Board. And basically, real quick, the requirements for dropping retardant have to be so that the retardant is dropped at a proper speed and a proper height. If it's not, you can cause that retardant to not be dropped at the proper coverage level, not at the proper footprint. It can knock over trees and it can actually do damage and injury to people.

So when we start talking about A-10s and 747s, or whatever else is out there, whatever those aircraft are, they have to drop the retardant at the specified speeds and drop heights that I just gave you. And the drop heights are anywhere between 175 to 250. So if you've got an A-10 that's rolling out there at 250 knots, that won't work. If the A-10 can drop its speeds at anywhere between 110 to 145, which is about the range of most air tankers today, that's the optimum speed for the retardant.

They also said that we don't need lead planes out there. I won't take that personal because there are times where you don't need lead planes out there. Each air tanker that's in the nation today that's operating on a contract is initial attack rated. They don't need a lead plane out there, they don't need an air attack, they don't need anybody on the ground. They're capable of dropping retardant by themselves. Lead planes, air attacks and other people are added into the safety loop to help that tanker

pilot make proper decisions, test the turbulence and air that's out there and to give them guidance.

The air attack is, again, another safety level that is out there. They help the command and control, as you said there, Bill. They talk to the people on the ground, they get orders, they have the big picture and they can relay that information to the lead plane pilot, the helicopter coordinator or the tanker pilot. And with that, that's about it. The ASM also does the same thing, except we do it with the lead and the air attack in the same airplane. Now I'm done.

AL HYDE (?): Now you're done. Right, let's take a 10 minute break and then we'll see where we're at, and I think we may be almost done.

(Audio break)

MR. : -- I just want to thank the panel for the onerous task which they've undertaken, and wish them the best in carrying it out.

MR. : Well, thank you very much. Ken, if you'll come over and sit down we can adjourn and then we can -- you all can continue the conversation.

MR. : Thank you.

MR. : Does anyone else have anything? Let me just say what the panel -- tomorrow we're going to meet with the government folks here and listen to their viewpoints. We've done that in other areas that we have been. And we continue to welcome any input that you might have to the panel that can be reached to us. Any of us have cards with e-mail addresses, or you can get it to Al and Al will get all the information to us.

Let me say that I think I speak for all the panel. We understand the gravity of the responsibility we've been given. Each one of us is working very, very hard to try to both understand and go through all the information that we are receiving. I think honestly we do not have an adequate amount of time to do the task that we have been asked to do. However, given the realities of the contracting schedules with the Forest Service, probably the timeframe we're on makes sense if we are going to have input. And obviously I think there's other attention -- other groups that are going to be focused on this issue. So we hope to have our findings and we hope that they will have a positive impact.

I say in closing, and many -- see if any of the other panel members would like to say anything. The one thing I've been impressed with everywhere we've gone is the commitment and the spirit in all the individuals, whether they be on the ground or in the air, in terms of the mission, being mission oriented and dedicated to the work they're doing. And I'm very respectful of that and that's why I hope that what we do will be found -- will be useful in this whole effort.

Do the other panel members have any comments? If not -- Jim has.

JIM HULL (?): Up until 1996 I could have counted the number of airdrops that were made in Texas, either from helicopter or air tankers or whatever, on one hand. And since 1996 as I visit with you folks, it seems like every one of you have bee to Waco, Longview, Abilene, somewhere or another to help us out. And I think this is indicative of where not only our state but where the nation is headed, and where we must go as the resources continue to build, whether we're talking about trees, brush, watersheds and certainly improve property and people and all of that. And I appreciate so much the insight that you folks are bringing to the big picture of this. Not just one little piece here and another little piece there, but your understanding in helping us understand the reality of the magnitude, complexity of what this whole thing is about.

And, Mr. Cochairman, I think the information that we've received today is very much equal or exceeds what we've had in any town hall meeting, and I very much appreciate also you folks, what you do and certainly what you've shared with us.

AL HYDE (?): Well, let me close by simply doing three things. One, I want to thank Doug Gill (ph) from Public Affairs for being here to handle the media schedule and everything else. And let me thank my good colleague Mike Rotonda. It's always a pleasure (off mike) the regional aviation officer who set all this up and helped (off mike) and any of the real problems because at Brookings, (off mike) measured up to your expectations, sir.

And then finally, I don't know how Albuquerque traffic is -- reasonably fast, be careful driving home. It's a lot more dangerous than flying.

(End.)