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## Opening Remarks

Major General R. A. Rushworth

Vice Commander, Aeronautical Systems Division

Thank you, Bill. Good morning ladies and gentlemen. It is a pleasure for me to welcome this group and open this symposium. As Bill says, I've been involved with this a long time, as I guess I've seen it from all directions, having worked on papers to go into the handbook, having worked on airplanes to satisfy the specification, having rewritten things that go into airplanes, and a variety of different things. I certainly didn't think when I started out some twenty-five years ago that I'd be up here telling you people that maybe we didn't do it all right then but there has been a change in the overall environment.

Your workshops are tailored and you're zeroing in on one specific thing: how to revise a particular specification that is very important to every one of the people who get involved with flying within the military. It's equally important for the Air Force people, as it is for the Navy, the Army, the contractors, NASA, civil service, wherever it is, and also translates into the total civilian community regardless of whether it's light airplane flying or large airplane flying. I think what we've done in the past, things that we've dictated have translated very well to help solve some of the problems, but I'm not sure that in the past even though we've had the flying qualities, 8785B, and they've been revised and updated and whatnot, that the specification has been totally adequate. I say that from both sides of the issue. It hasn't been totally adequate to satisfy the designers of the system. I think in that sense it's important that you do work here in coordination with all the people in the community to try to satisfy both of those conditions now.

Perhaps one of the questions that I could raise that I think you might be working on is (and it's a very simple question), "Have we had

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recent change in the environment?" I personally think that we have. I've seen a trend over the last few years wherein people are trying to do more with airplanes than we've thought possible; not that we haven't wanted to do it before, but we knew that it was just impossible. But now we find people doing things with airplanes that we don't think they should, and they want to do it. The operators want to do it, because it's important to them in the roles and missions that they have to carry out. I think that should be paramount in your thinking as you go through these particular workshops and through all of the subjects in that, again, I think that we're asking more of older airplanes now than was ever conceived before. I'll give two specific examples, that show what the criteria are. The F-4 is an extremely good airplane brought out by the Navy some 15 or more years ago to do a specific job. When we got that airplane into Vietnam both the Navy and the Air Force were using it in completely different roles than for which the airplane was originally designed. We lost a goodly number of airplanes because we had not adhered to the total handling qualities/flying qualities within the specification of the specific airplane, and the airplane just was being directed, asked to do much more than we ever envisioned, originally. I can bring up another fighter-type example. Although it's a trainer, the T-38 is being asked to do much more today than was ever conceived of it when it first came out back in the early 60's. TAC is using it as a trainer. It's a very good trainer in that we can train young pilots in their initial flying careers, but it's being used now as a trainer in gunnery. It was not conceived for that, and it is not a particularly good airplane, as far as handling qualities, for that, but it is the best that we have and it's one that hopefully we can keep around for some time. But you'll see as pilots transition they do have to have better equipment in order to do their particular job. The other big change is the B-52. We're going to be asking more of that airplane, and it's probably the oldest thing that we've got in the inventory that we're working on right now. We're going to be asking more of that airplane in the next few years than was ever conceived

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before. So a problem that we see is adapting old systems to the new environment and adapting new systems to the changing environment; we think it's a great problem. We hope that you can address that throughout your meetings here.

I might raise another consideration: I think in specific instances we have systems on board today that can easily be better in the handling qualities, the flying qualities, than the specification requires, and I think the F-15 could be an example. The F-16 certainly is an example. We're well into the testing of the F-16; we've found some different things and we've certainly been pleased with what we've seen, although with some pleasure there's also some concern. That airplane is going to have some limitations and restrictions that are within the flying boundaries that the pilot wants to operate in. That's to us a very serious consideration, but not to everyone. Everyone thinks that airplane is going to have all of the qualities, and the best qualities, that could ever be put into a system, and that's true. But it is going to have limitations because we can't insure that those pilots don't cross-control, don't get their left foot on the right rudder pedal, that sort of thing; sooner or later one of them is going to tip it off and it just won't return to normal flying. So we have concerns and as I say, there are systems right now that can do as well or better than the specification directs.

I'd like to transfer over to what I was looking at in one of your sessions here: session number two, "Special Problems 1." If I go down and look through those nine items, I think I can sum up in one word what probably is the most significant problem in our business today, and that is communications, or the lack of communications. I don't think it's difficult for all of the people to talk to each other in this room and be able to adequately address what you're saying and make the other individual understand it. That's not where the problem lies, and in prior years, perhaps, that's where we've stopped. We've always known that we could design an airplane and design a system to go into that airplane, put it out in the field, and expect it to work 90% of the

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requirements using command. What we've got to insure now is that the operator, since he doesn't have quite the effective communications capability as all of you people in this room, gets his opinion across, his requirement, his desire. Then it's going to be up to us and to you people in particular to make sure that what goes into that airplane, the initial design, the qualities, and what adds on as a system within a system, is going to be effective for the new generation of vehicle that comes out.

I'll talk on just a brief bit, about the future and something that's coming along: MIL-PRIME. I don't think in reality that MIL-PRIME is going to have a great effect or great change on any of the systems that we're conceiving right now. It perhaps, in a certain sense, may make it easier for the contracting community, the design community, in order to do their job, but the overall result is still going to be that we must satisfy the operator. We must satisfy his requirement and in certain cases we won't know that until the airplane is pretty well designed.

I'll leave you with one simple message: Hopefully we can get vehicles and systems that have good responsiveness, good repeatability and good reliability throughout the total flight regime. If you can do that, you'll have solved the problem; we won't need a symposium next year, and one handbook specification will take care of the whole issue. Thank you very much. Have a good day.