INNOVATIVE APPROACHES TO RECURRENT TRAINING

Chairman: Hank Noon, Command Airways
Co-chairman: Miles Murphy, NASA

CAPT. NOON: We elected to use the panel approach. If Guy Crow is here, we'd like to have him join us. Francis Cash from PBA had agreed to sit on the panel, but unfortunately he was called home this morning.

We had a very large working group. There were 15 of us in the room discussing these problems of recurrent training, and we had quite a wide range of people from small operators on up to the very large operators, and so it was a very diverse group and a lot of discussion before we really were able to settle down to put some ideas on paper. It was a surprisingly active group, very bright and a lot of enthusiasm and a lot of ideas. Since we ran so late, most of the participants had to run for the bus, and Miles Murphy and I finished up making a very brief outline. We will go through our outline and try to fill it out as we go along.

The first thing we did was to question whether recurrent training is necessary. It was unanimously reaffirmed that there is a need for recurrent training, and that it is a very important element in every training program.

We tried to set down some objectives of recurrent training. The first one is to fulfill legal requirements. The second is to fit the needs of the airlines, and in this regard, we felt that it may require some type of petition to change FAR's so that innovation is encouraged, and I think that RAA has already started to work on that. So we didn't go any further.

Number three is that incorporation of cockpit resource management is an absolute necessity.

Number Four is program guidelines. Needs and objectives derived from analysis, including cockpit resource management must be developed and incorporated. Mr. Murphy, do you want to comment on any of these as we go along?

MR. MURPHY: I'll indicate something that was pointed out, that guidelines must· be tailored to the company's pilots and operations -- (that they must be more than general guidelines.

CAPT. NOON: I think initially in view of the fact that

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we are getting into something new for many of the airlines and some of them have obviously started a program to incorporate cockpit resource management and LOFT principles. But since this is new to most of the airlines here it is time to systematically analyze the tasks that must be performed, tailor the training program to meet the needs, establish standards that have to be met, and determine the skills and knowledge needed, and their availability.

The next thing discussed was how to meet objectives, considering both and cost effectiveness since we are all cost conscious.

Another suggestion was that we need a continuous feedback system; both to maintain the program and the standard, or to change them as needed.

One thing that continually kept coming up was that the group hoped that RAA would supply the leadership to develop an overall program that each airline could tailor to its needs. Another idea was that a training group be established within RAA. Another suggestion was to make use of accident/ incident analysis, possibly consulting with NASA to provide the data and figures as to where we should put our emphasis when we do recurrent training.

MR. MURPHY: Just to add to that, I think Bill Reynard mentioned risk assessment, and that seemed to be the concern of many of our group: not knowing exactly what some of the risks were with respect to specific tasks, and hence, training priorities. It was felt that analysis over the industry was needed, and that we now have more for the large carriers than for the small carriers, or commuters.

CAPT. NOON: We could see where we pretty well narrowed it down to the highest risk areas in the takeoff and initial climb-out regime, and also the approach and landing but that isn't specific enough. What we would like is some data as to the history of these accidents, exactly what it is in the human factors that causes the most accidents, and zero in on them and try to find a way to train the crews to avoid them. At least make the crews aware of the dangers in these particular elements.

MR. MURPHY: One other suggestion in this area was that it might be good to have a seminar for training trainers that was sponsored by the RAA.

CAPT. NOON: Some of the reasons that were given by the group was that they felt it would be less expensive overall if the RAA could put together some kind of a program rather than the individual airlines trying to go out and hire consultants or obtain the necessary expertise, that some of

them just don't have the resources to do it, and possibly in some way it could be consolidated by the RAA.

MR. MURPHY: Also, there were several suggestions in our group for generating video training tapes. That point has been made by some of the other groups, as has the idea of a list of appropriate training devices. It was suggested that RAA and NASA participate or perhaps take a central role here.

CAPT. NOON: Some of the program elements are: ground school, with such things as video tapes, which should be interesting, stimulating and motivating. If you don't hold their interest, they are not really going to participate and benefit from it.

Two, training devices, credit should be given for use of part task simulators or training devices and the optimum use of the devices. Again, I think a lot has been said about simulators and the problem of their cost. Use of a simulator or training device is the ideal. Using an aircraft for training works, obviously, but one drawback to training in the aircraft is that the instructor must occupy one pilot seat, whereas in a simulator you can have the instructor standing back while the captain and first officer work together as a team. We think that's an important element.

Number three, simulation. I think that's been covered pretty well already.

One unique idea came out in regard to usage. That was the possibility of getting credit for observing a pilot, who's soon due for recurrent training, doing one of the items that is on the proficiency check while he is on the line. The idea is for it to be legally possible to sign that item off on his proficiency check and not repeat that item. I don't know whether the FAA would buy that concept, but for most of us the operation is such that our check airmen are out doing line checks or even flying as pilot in command. There is also the possibility of doing some of this checking on the line and signing it off. It would be done under actual conditions probably with a heavy airplane versus a light training airplane, and I think it has some merit and we should explore it, anyway.

To summarize, we have to systematically analyze what we need in the way of recurrent training, and start off with a fresh program that will incorporate the cockpit resource management and the LOFT principles.

MR. MURPHY: One additional concern with respect to cockpit resource management was the one-man versus two-man

crews. I know Clay mentioned that interpersonal interaction within the cockpit was a major focus of CRM as they addressed it. But there was a lot of concern expressed about resource management for one man crews, and a recognition that although requirements would differ, there was a large potential for resource management application there.

Another thing with respect to resource management was that it should be introduced in initial ground school and kept as a major part of the ground school throughout recurrent training.

Another concern was with pilot in command versus second in command. Some airlines have crew members who have only flown as pilot in command in a single pilot operation prior to coming to a two-man operation. Initial training was the major issue here: doing something about resource management training, but there were possibly some recurrent training issues also. It was pointed out a simplified, LOFT-like scenario could be done using two chairs and a cardboard mockup, that you didn't have to have a full-time simulator or training device to handle that problem. One group member later identified one of his concerns that was not discussed in the speaking session: recurrent training should motivate continuous learning throughout the year, and not be looked at as occurring only during the training day.

CAPT. CROW: This is sort of an additional summary. In our discussion we all acknowledged again that in all phases of life, modern day personal life and occupational, ongoing training, refreshers, returns, whatever, is absolutely necessary to survive in the changing atmosphere and environment. So once we acknowledge that, we must attempt to simulate and to use all the devices possible to make the training as meaningful and as objective as possible. Too often training by operators is approached with the idea of meeting a legal obligation, let's don't go through that again. We must accept the fact that training is essential and will pay dividends, obviously, in safety records and so forth. All the other panels have discussed various ways that we can hype up, if you will, the training to make it more interesting and meaningful to the participants.

CAPT. NOON: There are just a couple of other miscellaneous items. It was pointed out to us that the people who really have studied these training programs say that a device doesn't necessarily have to exactly duplicate the airplane to have value. In other words, in the past, the governing concept was that training had to be done in an airplane to have value, or some device that felt exactly like the airplane. It was also pointed out that experience now indicates that this isn't necessarily true, that you can

have a reasonable training device and do a maneuver that doesn't exactly feel like the airplane, yet the experience can train you to handle a similar situation in the airplane. In fact, when a person so trained does subsequently perform in the airplane, he or she does just as well as if the device exactly duplicated the airplane. I think this idea opens up some new thinking on the use of devices that are not necessarily full simulators.

One other thought is that any way of mechanizing has an advantage of reducing cost, but also better standardization and more consistency in the training because instructor variance is eliminated. One instructor may cover one point more than another, or she or he may even omit a point with one student and pick it up and spend more time on it with another student. So, there could be more consistency in a mechanized program than in a program that uses an instructor. Of course such an approach should contain the proviso that someone be readily available to answer questions not adequately covered by the mechanical program.

MR. MURPHY: Two other concerns were expressed; and they may really be one: First, how to evaluate alternative training methods in terms of effectiveness. How do you measure? That is an old problem that was really brought out several times in our group. The second was how to ensure that needed behavior changes are being produced by the training program. I think these two concerns may collapse to: how do you measure or evaluate the effects of specific training content and methodology both in the short and long run?

CAPT. NOON: It would seem as though if you went into that kind of a program you would have to run a certain number of students in the simulation, whatever it happens to be, and then test them in the airplane to see if it really, truly was effective.

MR. MURPHY: Yes, and I might have concluded my statement by saying that measurement and evaluation methodology is an appropriate research area for NASA. During some later thinking I developed a mnemonic that summarizes and gives a general sequence for the major training program developmental steps that we discussed. In that it may be useful to others, I offer it here: A "NEED" approach to training where N = Needs assessment, E = Elements of Instructional Content, E = Evaluation Procedures, and D = Devices.

CAPT.NOON: These seem to be the more important points and the highlights of our group's efforts, and that's all we have unless someone has questions.

DR. LAUBER: Thank you, gentlemen. Any questions or comments that you want to direct toward Working Group VI?

I think one of the issues that you brought up that resource management applies to the single-pilot operation is an important consideration. I think there is more to resource management than simply the interpersonal aspects of it.

Any comments or questions? Yes, we have one here.

MR. SCHOBER: I think one of the items that's been alluded to throughout the program but really never made explicit was the fact that by and large most flight and ground instructors' background really isn't in education, and yet a lot of the items we're bringing up have to do with such factors as instructional design. We don't really have the background for that. We really need some help in that area, I think.

CAPT. NOON: Well, I would say that this would be part of the systematic evaluation or analysis of what our needs are, and then finding the means to achieve the training objectives.

MR. SCHOBER: Yes, it's that evaluation process that we really need some guidance on, and I think that's an area probably where NASA can help us out.

DR. LAUBER: Yes. NASA can possibly be of some help in that, although, I would encourage you to resort to resources that already exist in that area, and perhaps through the RAA again, pool resources. There are organizations that are in the business of providing training and analysis and consultation with regard to the structure of training programs. I think your point is very well taken, that expertise does not generally exist within individual carriers except for the larger ones, and that it is necessary to draw on that kind of expertise and pull together to design an appropriate training program.

MR. BENSON: Ed Carroll had made a comment before about setting up standards -- the type of pilot characteristics that you're looking for, and then in a screening procedure starting to target those and eventually increasing the maturity of our pilots. One of the things you might want to consider in recurrent training and evaluation, each one of them separate, but also linked. So that as you set a person model in place of the type of pilot that you're looking for, with the personality characteristics that ultimately fit that person model, then you begin to bring into your pilot grouping the type of individuals that fit the image that you're looking for down the road. Link your recurrent

training to the management characteristics that you really want in the cockpit. Begin to establish performance standards that are measurable, that really give you some idea as to the efficiency of the pilot and his crew, and then begin to hold supervisors, chief pilots, et cetera, accountable for the maturation of the performing standards of each of their pilots. As you identify the strengths and the developmental meeds in training, you then hold the supervisors accountable for maturing those particular performance standards in the pilots while they're in the cockpit. Even though screening, training and evaluation are three different areas, they do have some overlap and do need to be addressed in the linkage type of concept.

CAPT. NOON: I agree with you on this, and I can speak for Command Airways and what we base our evaluation on. For a new hire, we have a probationary period, and we evaluate him on his potential as captain, not as a first officer. We start that process right from the beginning and, in fact, I have a meeting with the president of the airline the first Monday of every month, and we review the people that are still in the probationary period and comment on their progress. We have a pilot review board who also looks at the evaluation forms that we get. We have a regular program. The evaluation forms go out to the captains twice a month and they fill them out to determine if he is ready to be a captain, and whether he has the potential of being a captain. That's the way we review them, and I think it's a very important point, and we probably didn't address it because we were focusing on the recurrent training, but this evaluation process could well be part of the recurrent training program.

MR. CROW: As an example, I'd like to point out a thought that has occured to me of what this conference, this seminar is all about. We must expand our horizons in the area of training. An example I want to cite is that after many incidents or accidents, or irregularities, et cetera, I have seen the pilots involved called in for a proficiency check. "Something is wrong with these people, let's take a look at them." I believe I've yet to see one fail on this proficiency check done immediately afterwards. So maybe the things we've been training in the traditional maneuvers and the handling of the system, and the methods we've been using aren't doing the job, because after they've been involved in these things, they can, in most cases, demonstrate proficiency. So I thought I'd like to bring that out as the very epitome of what we're talking about, that they must reach out and decide what is needed in training.

DR. LAUBER: Mike Yocum had his hand up.

CAPT. YOCUM: Mike Yocum, Pennsylvania Airlines. I'd

just like to comment on the single-pilot issue as it pertains to resource management, and perhaps in our presentation we didn't touch strongly enough on the importance of resource management for single pilot operations. I think I can identify a little bit with this and perhaps you can also, that each one of us become involved in personal management to where perhaps we have meetings with ourselves to determine our direction, whether or not we're reaching our goals, and to reassess our individual management techniques, perhaps, and just how we function alone in our own office. In the cockpit environment there's many other resources available when we don't have that second or third crew member. We have the resources of Air Traffic Control and, as Clay did point out in our presentation, we have the hardware resources within the aircraft, itself, and the software in the case of enroute charts, approach charts and so forth. All of these resources, again, have to be properly managed, and while we've tended to focus on the human element involved in this resource management, very definitely it all has to come together to where even the single pilot operator and the single pilot, himself, needs to be exposed to the concepts of some sound management practices. Just to give one more example, I can remember in the very early days of learning to fly, one of my instructors pointed out, that if I were sitting there fat, dumb, and happy as he put it, I was probably missing something and avoiding proper resource management, although, he didn't use those exact definitive words of resource management. Thank you.

DR. LAUBER: Thank you Mike.

Other comments or questions? Yes.

CAPT. DEREN: James Deren with Air Kentucky. The question was brought up awhile ago about maybe having someone that's on your staff, let's say, a training director, that they usually come up through the ranks of pilot and they're not experienced in education or any other needs you may have in your company. I'm sure every one of us here has a stack of resumes this tall, and one thing you may want to do is take some consideration when you hire somebody that you don't just completely go by the flying skill and their background in aviation. I currently have on file resumes from two lawyers and also a CPA, and not necessarily would that person fit in your flight department, but that is one source of getting some expertise in a small company if you want to pursue that direction.

DR. Lauber: Thank you. Yes, that's an interesting comment. This issue of selection has come up several times directly and indirectly throughout this conference, and I

just might add a comment that it is an extremely important element of your overall flight operation program, and I think there are some significant issues with regard to pilot selection standards that we probably don't even have a good handle on yet.

Let me give you one example. I think it's easily conceivable that the introduction of new technology in aircraft cockpits and the implications that that has for the airman's role in operating the system and flying the airplane has implications for selection standards. I don't find it impossible, in fact, I think it's extremely probable that the personality and other characteristics that we selected on twenty years ago or five years ago, or even now, for conventional technology airplanes may not apply in the future. I think there's been a shift in the system, and there's been a shift in the demands placed upon the people who operate the system. That has some implications for selection standards. Clay Foushee and I have been trying to map out some research in this area where we look at the whole question of selection standards and how that applies to new technology. So it is an important issue.

Are there any other comments or questions?

I'd like to thank the members of Working Group VI for their report. I want to make one final comment, and then I'd like to turn the podium over to Walt Luffsey and Alan Stephen before we close. This has been a very wide-ranging discussion, and I had some concerns when we put the program together, that, in fact, we might be ending up sort of diluting the focus of this whole conference by trying to attack the broad spectrum of issues that are related to training. I decided the risk was worth it, because, as the gentlemen pointed out just a few minutes ago, I think one of the things that has come through in this conference is that training is a system. It's a set of interrelated elements that are operating synergistically to produce a desired outcome, and trained airmen. You can't tack on this, or take away that, without affecting the way the entire system operates. I really encourage you to think about your total training requirements in a systems context, and to take advantage of expertise that is available to help in the analysis of your training hardware and training software, and so on and so forth. I think that was one important theme that I think did come through in this conference, and I hope that you all find that useful in meeting your own training requirements.

I'd like to thank all of our speakers whom I thought did an outstanding job. I'd like to thank the working group chairmen, both NASA and the industry people, and of course, all of you, because through the working group discussions,

as I said at the very beginning of the conference, it's your efforts that have produced the useful product, the useful output from this conference. I hope that the proceedings will be useful as a reference book, a set of guidelines to stimulate the way you think about your approaches to flight crew training, as a reference to find out who's doing what and when and where and so on and so forth. So I think from everything that I've heard and see, from our point of view, the workshop has been successful.

As I said earlier, we were fortunate to have Walt Luffsey, the Associate Administrator for Aviation Standards, with us today, and I'd like to ask Walt to come down and say a few words to us.

MR. LUFFSEY: Thanks, John. I'm really delighted to be here, and I want to thank you and Alan for the personal invitation I received, and I'd like the opportunity of being able to say a few words, too.

As I listened through what was said today, I took a few notes, and I'd like to start out by saying that I really am truly extremely impressed with the content of what was discussed. Note the word content started with C, so I started using the letter C to pick up some of the key points that I heard, and in a couple of places I'd like to emphasize some of the thoughts.

You mentioned coordinate. You mentioned cooperate. To me, those are two very important words. We need to carefully coordinate and we need to cooperate. Government and industry, FAA and industry, NASA and industry, and you took a single step today in that coordination process.

You mentioned cockpit resource management. You mentioned credits. When you talk about credits in checking, I'm going to bring you to a thought on that. I sometimes wonder if training programs truly have the right objectives or if our individual thinking really has the right objective. Not the FAA credit, that's not what's important, it's that the training program will meet safety objectives which you set.

You mentioned change, you mentioned creativity. Note all of those starting with C. You mentioned coherent and cohesive. All of those are necessary ingredients, obviously. You have spoken to credibility. And I want to emphasize that. Credibility of your program. You mentioned court. I'll give Bill Reynard that one, and I'll use it as a trigger to get me to where I want to talk.

The statute. I'll take it out of the judicial back to the legislative. The statute sets in motion your own reason

for being, not ours, although it articulates the need for FAA or CAA previously. We exist because of you, because you want us to exist, even though, individually you might not always feel that.

It's interesting to note what the statute requires. If you take two legs of the whole process, it requires that aircraft be manufactured to minimum standards. It requires that aircraft be operated at the highest safety level possible. Now that's paraphrasing, obviously. The FAA in the operating part of the business simply set minimum standards. You must at least meet those, but you're expected to operate to the highest level regardless of what those standards say. I wanted to point that out particularly. The role of FAA is simply standard setting. We do some checking on the system. The check ride itself is part of the system and not the means and the end to that system.

I guess the biggest C of all is that you today communicated. I heard, I listened, Dan Beaudette, who's been here all week did. Without pushing the objectives concept too far, I do want to mention one more time, FAA is receptive to change, another C, to innovation. You come to us and you tell us what you're trying to achieve, how you're going to get there, and if you make reasonable sense with it, at least we'll listen. We have the same interest you do: high safety standards, operation to the highest level of safety. I think you'll get that support from us. We are receptive to innovation.

I'm going to close out, although I could mention other C's like concern and cope and continuous feedback and all those notes that I took. I'm going to end up by re-emphasizing another C I heard, and that was congratulations on your birthday at NASA. We recently had ours, and it is a signal event. Twenty-five years in this part of the business at FAA, NASA, I had some experience in CAA before, and it's fantastic.

I want to thank all of you for being here and indicate to you that we'll try to do our part. Thanks, again.

CONCLUDING REMARKS

DR. LAUBER: Thank you, Walt. It is interesting the 25th birthday is today. From my point of view, I'll just add my own two cents to that. It's been an incredibly rewarding thing to work for this agency. We've had a lot of opportunity to work some interesting programs, and I hope to do some good, and I have thoroughly enjoyed every minute of it.

Dick Collie, did you have anything that you wanted to say before I turn it over to your boss?

MR. COLLIE: No, I can't improve on anything.

DR. LAUBER: Okay. Well, I want to thank you, Dick, for all the help. It's been a pleasure working with you in organizing this conference, and with that, I would like to turn it over to Alan Stephen, the Vice President of Operations for the RAA for some closing remarks.

MR. STEPHEN: Thank you, John. I would like to set the record straight. Dick Collie doesn't work for me. I live in mortal fear that Dick Collie will some day decide that he doesn't want to continue with us. It should be pretty obvious from the kind of role he's had at the RAA, that we look to Dick to provide real leadership.

Listening to the recommendations I heard this morning, I didn't hear one word about a need for regulation. What I did hear is that we have to do a better job in training whether as individual airlines or as a collective group of airlines under the banner of the RAA. That's a very important point, and it is the kind of leadership for which we look to Dick Collie.

The reason I was late to this workshop -- I wanted to be here all three days -- was that the General Accounting Office, an independent arm of the Congress, did a real hatchet job on our industry this past week. They are about to issue a report that said our operations are 20 times less safe than the operations of the large air carrier airplanes. To arrive at that conclusion they had to include the operations of air taxis, cargo, Alaskan bush operations even helicopters in the accident record. When, in fact, you sit down and look at just scheduled commuter operations to large air carrier operations, the safety records are very comparable. For example, on the accidents per hundred thousand landings, the average for the jet airlines is .38 accidents per hundred thousand landings, while accidents across our entire industry is about .63. So they're in a

general comparative range. Not twenty to one as the GAO concluded.

But in raising the issue, I did go back to look at each of the 47 accidents in our industry over the past three years. I was impressed with a couple of facts about those accidents. ' First, is a spectacular lack of causes that we saw in the past. Only one of those accidents related to weight and balance. Not one of them resulted from a crew member overscheduled or fatigued. There were no accidents stemming from a lack of maintenance or operational reliability. And, in fact, those accidents causal factors broke down to approximately 50 percent related to the pilot, 30 percent related to maintenance and other types of ground operations, and about 20 percent related to the environment, the ATC system, weather, that type of thing, a percentage distribution very comparable to the accident statistics of jet air carrier operations.

While many of the accidents were minor there's still some accidents that shouldn't have occurred, for example, an airplane taking off with a gust lock installed. I think that was the first thing I learned during my first flying lesson 20 years ago. Six accidents involved aircraft while they were taxiing on the ground, usually from carelessness. Two accidents related to refueling, refueling a piston airplane with jet fuel. I could go on with such examples. The point I am trying to make is related to quality, ands that's what cockpit resource management is all about. Quality and not more regulations in trying to eliminate those causes of accidents.

I liked the recommendations offered today very much. Because the RAA doesn't have to produce a hard dollars and cents bottom line, we can go back to our board of directors and, indeed, the entire membership, to get the resources for CRM. With your cooperation, we can do many of the things I heard this morning, and in cooperation with Dick Collie and your input, I'm sure we'll be back to you in the very near future with some ideas of what we can do in 1984 in those areas.

I hardly need to say that this workshop would not have been possible without the resources, the personnel and the dedication of the people of NASA, particularly John Lauber. I can only express with a great deal of gratitude, the appreciation for everything you've done in opening up the dialogue and giving us, perhaps, a sense of direction as to where we ought to go in the future in training. I'd like again to congratulate everyone here in the NASA organization who's been a participant on this program.

DR. LAUBER: Thank you, Alan. With that, once again,

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my thanks to everyone who worked so hard to make this
program go. It's been a pleasure, and we look forward to
the next time we can all get together. Thank you.