

## EASTERN AIR LINES LOFT PROGRAM

Captain Berton E. Beach

I'd like to thank NASA for inviting Captain Hardy and myself from Miami up here to a warmer climate and tell you how glad we are to be involved in the program. I've been, I suppose, preaching LOFT after talking with Captain Nunn some five or six years ago -- and am totally committed to the idea that line-oriented flight training is probably the best vehicle that's ever come down the pike for flight training.

There is, in each of the kits that you've been given, a paper that we presented about a year and a half ago at a NASA workshop on resource management. And if I may, I would depart from the text and use the outline that John Lauber has provided which covers some of the issues for discussion. A detailed look at how LOFT was designed and implemented on Eastern Airlines is contained in the paper of which you have a copy of examine at your convenience.

We've been in the LOFT business since about 1978. The first program we began was the Boeing-727, because that's obviously our initial training airplane for everyone who comes on the property. It's also the aircraft of which we have the most. The next airplane that was involved in line-oriented flight training was the Douglas DC-9. Currently, the Lockheed L-1011 and Airbus A-300 programs are approaching approval. I believe that by around February or so we'll have the L-1011 program in place, and the A-300 one shortly thereafter.

Beginning with scenario design and development issues, Eastern Airlines committed itself to the full four-hour LOFT training format without the additional time for specific maneuvers. We felt when we put the program together, looking at the way the scenarios in our opinion should have been developed, the full four hours is the best time frame to use.

Scenario design and development issues, origin, routing and destination- We asked ourselves when we first began developing the scenarios where we wanted to go, and why? We took a look at the various airports on our system that had specific things we wanted to look at. For example, Pittsburgh gave us a chance to do Category II work with an inner marker instead of a radio altimeter Decision Height. Charlotte gave us a chance to do non-precision approaches into a "black hole". Atlanta gave us CAT II possibilities with a very complex ATC environment to work in, as did Miami. And those were the four stations we chose. We continue to use those four stations to this day.

The FAA did require us, since we are a Category II and Category III airline, and since LOFT can be used for proficiency check or second in command check, and for second officer training, to provide crew training for Category II in each LOFT because each First Officer must demonstrate first officer duties in Category II at least annually. So we had that single constraint in developing our scenarios. We had to have each scenario include CAT II, and they do.

Abnormals and emergency conditions, pacing, quiet periods- When we began to develop the scenario, our operating word was realism. We were committed to construct the scenario or scenarios, as close to what actually happened in the airplane as was possible to do. We did not elect to use ground speed times two in the simulator. We ran everything and do now run everything in real time. Our criterion has been if it would happen on the airplane, it can happen in the simulator; if it does not happen in the airplane, we will not require it in the simulator.

Time in cruise, has been labeled by some as non-productive. We don't feel that is the case. Any departure in our opinion from real-time, real-world, degrades the training. We felt that as in the real-world, there are times when you can sit back and relax. We feel that quiet time is important in the scenario.

Generally, our scenario scripts are detailed scripts, written verbatim for the instructor to follow. There are a couple reasons for that. We feel that the instructor's principal duty in the simulator during LOFT training is to observe and to evaluate. It was a decision of the people who wrote the scenarios that there were certain things that we wanted to see. For this kind of training, we didn't want the instructor to go into business for himself. There were certain things we wanted to see and certain reactions we wanted to take a look at, certain evaluations we wanted to make. Therefore, we elected to tightly script the scenarios.

Scenario length- As mentioned, we chose to go four full hours. We feel that for our purposes that is the best time frame to use. We have three legs, the first of which averages about two hours, primarily because that's the leg during which we look at Category II approaches.

Category II requires us to make an ILS approach down to the lowest minimums, to miss out of one and land out of another, and we do that. The second leg is normally flown by the co-pilot; and we generally look at a non-precision approach there. The third leg is time adjustable. The abnormality that we have scheduled there can be given to him anywhere, which means if you only have 30 minutes left in the LOFT program, you give that

particular abnormality, let's say, at the gate. If you have an hour and 30 minutes left, you can give it anywhere you like, after takeoff, en route, on descent at the next point.

Operational problems- Cabin and passenger problems are a little difficult to illustrate in the simulator, although we have had diversions because of a cabin problem--heart attack of a passenger, that type of thing. But it's a little difficult to program a cabin emergency whereupon you open the cockpit door all you see is a room full of computers. It kind of destroys the illusion. So we don't do that.

Environmental problems- Weather, winds, temperatures, wet runways, and that type of thing are included in this category. When we put the program together, there were a number of things we wanted to look at. We decided there should be at least one major system problem on every leg. Usually you don't get into anti-icing, de-icing problems unless it's wintertime, so we chose winter. Our simulators are not Phase 3; they don't have daylight visual capability, so we chose night. I went to the weather department and selected a very nasty day, December 12, 1973, where there was a severe low pressure area around Atlanta with an honest-to-God Category II with freezing rain and snow and all the other good kind of things you like to look at. We took that specific day, and all of our LOFT training on Eastern Airlines on the B-727 and DC-9 is constructed around that day.

Equipment problems- Simple versus complex, airborne and ground equipment: we thought, as I said earlier, that there should be at least enough of a challenge in the LOFT program to stretch the minds of the people involved in training. It shouldn't be something that's a walk through. There should be some genuine deep, meaningful training where you get down deep inside the student's head and dredge out all that stuff he used to know about the airplane but forgot.

In every LOFT scenario there is at least one major fault; one major problem that the student can get himself in deep trouble with if he handles it badly.

Crew problems- Cabin and flight crew: we have done nothing with this category because I think it's a little difficult in the simulator. At least we haven't found anything that really works well for us.

Crew incapacitation- We do two kinds, subtle and dramatic. Subtle incapacitation is generally done around pattern altitude or approach altitude, two to four thousand feet, where the man flying the airplane fails to respond to whatever his next task is and the other man must recognize it and take over. Dramatic incapacitation is written to affect the Captain, and he leaves the seat. The First Officers like that a lot because it's the

first chance they have to fly the airplane alone and the Captain can't tell them what to do.

We make it a point not to interfere with the crew operation. As I said before, realism is the operative word we use. It is an airline flight. The instructor does not participate in anything except as a communicator and as the evaluator. In a three-crew aircraft, we have two instructors; the line Captain who is our Check Airman functions as ATC and observes and evaluates the front-end crew; the second officer instructor functions as the company radio, and he does the evaluation on the second officer.

With respect to real-time LOFT operations, I can't stress enough how much we feel that you must stick as close to the real world as you possibly can. Pre-flight planning and activities must reflect reality. On Eastern Airlines our dispatch papers, weather sequences, flight plans and the like are computer-stored and are available in Operations for the crew as they check in. They are also available to our crews in training as they check in for LOFT. MEL items are included. We are very concerned that the paperwork the man sees during LOFT training is the same thing that he sees on the airline in operation, because we feel it sets the tone for the training he is about to receive. We feel that the crew operates best in an environment with which they are familiar, so we do everything we can possibly do to be sure that the environment duplicates what they would have at the airport when they check in for a regular line trip.

The instructors act as the communicators and, ideally, they would be invisible in the simulator. In fact, the next simulator we are designing with the manufacturer's help will have the instructor's station as far removed from what is going on up front as possible to give the instructors the opportunity to disappear into the background when we do LOFT training.

The role of the instructor- The principal role in line-oriented flight training is as an evaluator. And you can semantically play with that word any way you like.

LOFT as checking- Before I arrived here and learned there was little and big LOFT, to me a check meant that you had to perform a specific maneuver within definite prescribed parameters, pass or fail. Check means to me an evaluation, I don't care how you cut it. So our instructors really are evaluators in this sense of the word.

Simulator capabilities and limitations- We have everything from a brand new AST simulator which very closely approaches Phase 2 with a wrap-around visual and landing credit approval, down to one of the last steam-powered reciprocating simulators left in captivity. And up until not too long ago, we still used

that older machine to conduct LOFT. We don't do it anymore, because it's just not maintainable -- the nav aids don't come up to speed; every now and then it just shudders and falls off the jacks; and we decided for obvious reasons that's not the way you want to train in line-oriented mode.

Crew composition and scheduling- I feel the best evaluation of a flight crew is with the whole flight crew in attendance. I feel, as has been mentioned here, that if you put an instructor or a check airman in the other seat, you don't really get the picture of what the crew is doing.

Scheduling a complete line crew is a problem since we operate about seven different domiciles but we do training, LOFT training, in three of those. Of about 4300 pilots we have had about 1200 go through LOFT training so far. We would have a great deal more than that if we had a little bit better scheduling flexibility. But we feel it's important enough to have the full crew in attendance so that they will perform as they would expect to perform on the line, that we have decided not to go with the instructor in the empty seat. We will fall back to some other training mode rather than to continue LOFT with the instructor filling the empty seat.

In reference to inadvertent departures from the scenarios, I'll bore you with an anecdote, if I may. The first DC-9 LOFT program that was given after we had the program approved by our local principal was given by me. In the flight departure papers one of the MEL items was that the autopilot was inoperative. The crew was being dispatched from Charlotte to Atlanta. The Atlanta weather was measured 100 feet overcast, zero visibility, RVR, nine left was 1200'. When we put the scenario together, it was anticipated that the crew would obviously not accept the airplane because you can't fly a CAT. II approach without an autopilot. The crew accepted the airplane without question. So now what do you do? What you do is let him go with it, which is what you must do in any case. Whatever happens, unless it's a simulator glitch, you live with his decision and so does he. So we trooped out to the airplane (simulator), launched from Charlotte to Atlanta, and at a place named Toccoa at around 17,000 feet prior to being released to approach control, the Captain used an expletive (I would use the word but there are ladies present) which indicated to me that he all of a sudden remembered that he wasn't supposed to be there. He said, "Oh, blank, we don't have an autopilot". Now the crew had three choices, divert to Knoxville, or Chattanooga, or Birmingham, or wherever they wanted to go; lie about the failed autopilot and hand-fly the CAT. II approach into Atlanta, which some of us might have done; or he could go back to Charlotte and expose himself to the wrath of Borman, which he chose to do.

Now, here you are. We had spent a great deal of time constructing the scenario in exquisite detail and the Captain blew our whole plan. The next question is, what do I do on the next leg back to Charlotte? As it happened, he gave the airplane to the copilot to fly, so I cranked that in as Leg Two, and I applied the problems that I had already decided to use on Leg Two, and so we proceeded to "fly" back to Charlotte.

When he got out of the airplane (simulator), the Captain said, "What am I supposed to do"? I said, "What would you do in the real-world? First of all, you'd call Frank and apologize. Second, you find out what the weather is, refuel, and go on back to Atlanta", which is what we did. And thereby ends the anecdote. However, I think the chances are slim that he will ever again just give a cursory examination to a set of flight departure papers--which is part of the LOFT exercise.

Departure from the scenario due to a simulator malfunction is something that we have to live with in the age of electronics. Ignore it if it's a minor glitch, or stop LOFT and revert to another kind of training if the simulator is irreparable for the line-oriented mode of training. We don't have major problems very often, but it is something that we have had to deal with, and when we do have a major problem you just about destroy the reality of the scenario.

Performance assessment- The role of the instructor in LOFT debriefing. As someone mentioned earlier, the debriefing will generally be commenced by the crew themselves as they exit the simulator. Most of the time, you'll find the crew talking about what they did as they come down the stairs walking to the briefing room. Most of the time the Captain, First and Second Officers do their own debriefing. The instructors should take notes about those things which they want to highlight in debriefing. The role of the instructor, generally, in debriefing is one of summation, what went wrong, and why, if you can figure that out.

Training vs. checking- Training versus checking is obviously something that's a very sensitive area today. LOFT for checking, I think, is not a very good idea. Full-mission simulation for checking, perhaps so. And I think I will just leave it for that. Let's leave it for discussion in the group.

Satisfactory completion- On our airline, the instructor who conducts the scenario decides whether the people are satisfactory at the end of the scenario or not. If he decides that the crew in total, or an individual in that crew, needs extra training, we give him extra training to the extent that the instructor recommends. In the statistics I have here in front of me for last year (1980), we ran about 224 scenarios; there were five people brought back for additional training. We

do not permit--and it's the instructor's dedication to the program--we do not permit someone to go back to the line who we feel is not up to our standards, not the FAA minimum standard but our standard. I daresay that our standards are very high.

Use of video or performance data printouts- We do have in two of our simulators a hard-copy printout available of any portion of the flight. In line-oriented flight training we rarely use that capability. We don't like interruptions in the flow of the scenario to address a problem that happened in that scenario. We believe that it destroys the feeling of line flying and therefore degrades the training effectiveness.

Number of instructors- All of our instructors are line-pilots, all of our check-airmen are line-pilots. The people who instruct in LOFT are those who are on permanent staff in the training department. We do have temporary people who fill in from time to time when the training loads are heavy, and some of those who have an appreciation for what we are trying to do are LOFT qualified, but the majority of our temporary instructors are not.

Instructor training and standardization- Put ten airmen in a room and give them a problem, you'll probably come up with ten different solutions. Standardization is a very serious problem, particularly in something as subjective as line-oriented flight training. We have managers of standardization on every aircraft type, and they observe our instructors periodically to maintain standardization. All of our LOFT programs are precisely scripted which is of considerable help in standardizing our LOFT program. To further develop a standard program, on those simulators which have the capability to automate lesson plans, we will soon begin to write simulator programs which will take advantage of that capability. This will do two things for us. It will ensure that the script is carried out the way it was written. It will also relieve the instructor from the necessity of doing the programming himself, and therefore, give him the opportunity to observe and evaluate which is really why he is there.

Initial, transition, and upgrade training- We have designed a couple of programs which aid us in reducing aircraft time by using the small LOFT format to practice dress rehearsal for the aircraft portion of the type rating. We have by using the LOFT format--full mission simulation, if you like--reduced the average flight training time for a Captain who was upgrading from First Officer on a Boeing 727 from about 3-1/2 hours to less than an hour and a half. We are doing the same thing on the DC-9, A-300, and L-1011.

We have just finished running six experimental students through our nine-simulator period/zero-aircraft training

program. They will also be given airplane training because the program is not approved just yet. That particular program is written entirely in full-mission simulation. The program is nine periods long. The eighth period is a FAA-conducted type-rating for the Captain; the ninth period is the LOFT which is part of the on-line training. We emphasize the day that a man walks in the door that he is flying the airplane. We start out just as we used to do in the airplane with clearances out to the training area. If he must do steep turns and approaches to stalls, we do them in the old training area just off-shore in Miami. We still do that in the simulator. We go over to Dade-Collier airport which is our training airport and shoot approaches just as we used to do in the real airplane. The whole idea is to get the man away from thinking that he is in the simulator and get him to thinking about the airplane. We are using LOFT to develop procedures which are currently in use. Incapacitation is one. We were concerned about the fact that we have no written procedure for crew incapacitation. Our experience with LOFT has shown that there are many answers to what the crew will do for a given situation involving incapacitation of one crew member. We have not had a crew with an incapacitated member have any difficulty in safely landing the aircraft. Consequently, we have decided not to formulate a written policy on crew incapacitation.

Equipment evaluation: about a year or so ago we started going out to the various manufacturers to look for a radar simulator. I think that's the only thing that is missing in LOFT. It's within the current state of the art, now with digital radar systems radar simulation is possible. If we only had the money, we'd have one right now. So you can use line-oriented flight training as one of the best devices in the world to check out new equipment.

In summation, I still feel that for any training purpose you can define line-oriented flight training as the best vehicle.

#### Discussion

CAPTAIN CAVANAGH: If instructors disappear, as you described, in future simulators, how do you propose to have him critique or participate with the crew?

CAPTAIN BEACH: Well, "disappear" is probably not the word I should have used. There is LOFT for recurrent training and LOFT/full-mission simulation for initial qualification. In initial qualification training, I would deal with you in the same way that I would deal with you in the airplane--I would talk over your shoulder. In recurrent training, where we run "pure" LOFT, to use your term, the instructor should not be

anywhere where the student can turn around and say, "Did that really happen or was that a simulator problem?" There are two kinds of programs to look at. In "pure" LOFT, the instructor should be as unobtrusive as possible. In initial or upgrade training, where you are actually trying to teach something, he can be there. That is not really the problem. The problem is to make him invisible in recurrent training.

CAPTAIN CAVANAGH: I guess my question still is, he cannot physically get very far away because he has got to know what is going on.

CAPTAIN BEACH: That's very true.

CAPTAIN CAVANAGH: Okay, that's all I wanted to know.

CAPTAIN NUNN: Bert, you mentioned your two instructors--the captain and the second officer/flight engineer instructor. Of course, the captain instructor is up front to observe what they are doing, and the second officer instructor is to observe what the second officer is doing. My question is, could you elaborate a bit on what your experience has been in the debriefing session as to what one instructor will give to his counterpart? Will the captain instructor critique the second officer at all or vice-versa?

CAPTAIN BEACH: Yes, there isn't any line of demarcation between observations, no matter by whom. It is all grist for the debriefing mill. If the second officer instructor has seen something at the front end that the captain and first officer have done, and the captain instructor did not; he is free to put that on the debriefing table for discussion. It is just like any other type of crew interaction--you have overlapping areas of responsibility, thus there are overlapping areas of observation. There is no distinction made in the debriefing about who is responsible for what portion.

CAPTAIN CAVANAGH: Secondary to that, do you consider this to be an important element of what we are here to discuss--whether one or two instructors are necessary in a three-man crew?

CAPTAIN BEACH: Yes, probably. Again, this a personal feeling based on working with the program with two instructors. Obviously, on the DC-9, there is only one. If it is a two-crew airplane, there is no one else to watch. There is so much happening in an airplane even as small as a Boeing (727) and certainly in one the size of a 747. I do not believe one instructor can really make all of the pertinent observations that need to be made. I feel that two instructors should be there--that's my opinion.

CAPTAIN CAVANAGH: When you register a dissenting opinion, I'll stop there.

DR. LAUBER: Bert, did you want to say something about the videotape that you brought?

CAPTAIN BEACH: Oh yes, not too long ago, we put together an hour and a half videotape that we intend to use for training LOFT instructors. It has a crew being briefed, portions of the flight, and the debriefing. We brought two copies, and they are available for the working groups or for whatever use they can be put to.

DR. LAUBER: Bert, I have a question, and it has to do with the difference between your approach to LOFT for the two-crew versus the three-crew airplanes. Other than the obvious differences between types, are there other considerations involved?

CAPTAIN BEACH: No. The only difference is the way the airplane is operated.

CAPTAIN FRINK: I hate to keep harping on the same old subject again, but in the course of running all training in real-time as you do, versus what we old-fashioned people do where you use repositioning and repeating problem areas over and over until the crew learns how to handle whatever the problem is--I assume that we are not the only people who have airmen who occasionally have problems like that--it would appear that there must be built into your program quite a bit of additional time that must be set aside in order to handle problems or people like that. Everyone going through a transition program cannot possibly go from one maneuver to the next or from a situation that has a maneuver in it and just redefine and go on to the next one, continuing in the development of his knowledge of the flight characteristics or problems of flying that particular airplane. How do you handle that and stay in a LOFT atmosphere, or do you attempt to do that?

CAPTAIN BEACH: I assume you are not talking about recurrent (training) now?

CAPTAIN FRINK: No, I am not talking about recurrent. I am talking about what you and Dale (Cavanagh) mentioned--trying to do all your training, not in a "capital" L-O-F-T, but in a full-mission simulation.

CAPTAIN BEACH: You are dead right when you say there should be slack left in the program to teach, to iron out those wrinkles that cannot be done in just one shot, and we did not. When I wrote the program, I made a tactical error. I asked to combine the simulator and airplane training programs, and I asked for

nine periods. What I should have asked for was eleven so that when my boss cut me down to nine, which I guess he is always a little prone to do, I would have had a little more flexibility than I do now. But, we do have enough time--Captain Hardy wrote the program so I am stealing his thunder. I told him to be certain that we had enough time in the event that there was a problem to be handled. We wanted to address that problem and still stay within the nine-period framework. When we looked at all the requirements under Appendix E that we had to accomplish in nine simulator periods, we found that there is enough time to iron out the wrinkles that do develop. If the instructor feels that it is necessary, he can "suspend" reality long enough to iron out the wrinkles that do develop. That is to say, if a guy can't get it from 500 feet to the end of the runway, we can use "snapshot" recall, suspend the LOFT for a moment, iron that wrinkle out, and then press on with the program. We do that from time to time.

CAPTAIN FRINK: Can you tell me the difference in time between your former simulator program and your full-time simulation program and the use of nine periods?

CAPTAIN BEACH: Six four-hour periods which we lengthened to nine, but that does away with the airplane entirely--or it will I should say. I am describing the program we would use for zero airplane time.

CAPTAIN TRAUB: What is your crew complement in this zero airplane program?

CAPTAIN BEACH: Two kinds, depending on what our training mix happens to be. Right now that is concentrated on the captain and first officer. You can do two first officers. You can do two captains. You can also do a captain, first, and second.

CAPTAIN TRAUB: Do you have any preference?

CAPTAIN BEACH: If I had my preference, we would do three crew members, all three together.

CAPTAIN TRAUB: Captain and all crew members?

CAPTAIN BEACH: We would, for the crew complement training. I would prefer that, but the economics of scheduling and training loads do not always permit it.

CAPTAIN MICHAELS: I would appreciate it if we could have a response from other carriers who have LOFT programs also (on this question). First of all, do you introduce any misleading elements into your scenarios?

CAPTAIN BEACH: No.

CAPTAIN MICHAELS: For example, do you try to induce a man to make a decision-- to land in a crosswind in selecting a longer runway?

CAPTAIN BEACH: No. There are no "got-yas" in my program and deliberately not. As a personal point, I do not feel that type of training is valid and not in a training simulator. But, if it can happen in the real-world, it should happen in the simulator. If it does not happen in the real-world, I can see no reason to try to trick someone into doing something that he would not ordinarily do.

CAPTAIN MICHAELS: That's good, but for example, say you have an engine failure in the initial stages of the climb with a fire, and the procedure is to shut the engine down. During the follow-up procedure, the engineer hits the wrong engine off switch, and now you have got . . .

CAPTAIN BEACH: Now you have got a double engine flame-out.

CAPTAIN MICHAELS: That is a barrel of alligators for the captain to handle, and he should not have to--it was not in the scenario, and he should not be jeopardized. How do you handle a situation like that? Do you plug it up?

CAPTAIN BEACH: No. The whole philosophy of our program is that if you mess it up then you have to get yourself out of that mess. If your crew member puts the wrong hand on the wrong knob at the wrong time in the real-world, you would live with it, and you do in our program as well. We do not interfere. That's about the time the captain leaves stripes this wide on the guy's back during the debriefing. That is what it is for.

CAPTAIN MICHAELS: How do the others handle it?

CAPTAIN CAVANAGH: Same thing. If you start from the context of no failure, that it is a training situation, you learn from it. The captain may not have learned anything other than he wishes the second officer had not done it, but the second officer may have learned a lot. It is beneficial to everyone to recognize, for whatever reason, they did something they should not have done.

CAPTAIN MICHAELS: How about the first question? Do you introduce anything misleading?

CAPTAIN CAVANAGH: We do not do anything with the intent of misleading. Sometimes, with the best of intentions, it happens, but I do not deliberately try to trick them.

CAPTAIN FRINK: I think if I sense the basis of your question correctly, you are concerned about a captain failing or being criticized for a situation which was not his fault. I do not know of anyone involved in this operation who would hold a captain responsible for that specific problem. However, the captain, first officer, and second officer are going to be responsible for what happens after that, as far as their command ability, organization, and resource management are concerned, and quite properly so. But, the engineer is the one who will be criticized; certainly not the captain.

CAPTAIN MICHAELS: But, he still lives with it to the runway, or he "dies" with it.

CAPTAIN FRINK: Even if he "dies" from it, it is not the captain's fault, it is the engineer's fault.

CAPTAIN MICHAELS: He just picked a lousy engineer.

CAPTAIN FRINK: It's just the end of the exercise.

CAPTAIN WHITEHEAD: In answer to you, Jim, we brief on this aspect before we enter the simulator. At Delta, we do not compound any problems or try to present problems that they would not be able to anticipate on the line. We do advise them that if they use an improper procedure and compound their problem, they will have to deal with it in the rest of the operation.

CAPTAIN WILLIAMS: We do not try to trick them at all. Of course, in our case and depending on the altitude, if the copilot shuts off the wrong engine, it's all over--because we only fly two-engine airplanes.

MR. WARRAS: I guess that if the focus remains on pure training with no jeopardy involved, my concerns are inconsequential, however, if evaluation jeopardy creeps in somewhere down the line; I think it would be grossly unfair for a captain to be criticized and have his "ticket" in jeopardy.

CAPTAIN BEACH: There are a couple of safeguards that I think will prevent that from happening. In the first place, you cannot get into the simulator without being evaluated. I don't care what you are there for, someone will comment, to himself perhaps, on how well you did. But, the concept is training--whatever happens to you, you are supposed to learn from it. Otherwise, there is no reason for you to be there. If the scenarios are designed properly by people who know what they are doing, you will learn a very valuable experience. There is always the possibility that you will need a little remedial training as a result of not being up to a particular standard.

But, it is stated in the very beginning, often in great depth, that LOFT is a no-jeopardy operation which is specifically designed to permit the crew to demonstrate their best solution to the problem without having to worry about what they think the instructor wants to see.

CAPTAIN ERICKSON: What do you mean, no jeopardy?

CAPTAIN BEACH: That means do not put your ticket on the table, I don't need it. The old system where you put it on the table and if you don't mess it up, I will give it back to you, is not what this idea is all about.

CAPTAIN JENSEN: There is one more aspect of this. If, for instance, the second officer does something fairly catastrophic like you have just mentioned, it does not necessarily mean that the captain is going to suffer from it. As a matter of fact, he might come out a lot better. He might handle something that even ends in their supposed death, and he might do a tremendous job of it. Normally, in the LOFT sessions that I have been associated with, you can tell how he is doing and how the other man's actions have affected him.

CAPTAIN LIDELL: You mentioned that you keep them over for a little brush up. The question that I would like answered by those involved in LOFT is, do you put it on a pilot's record when he is kept over for extra training?

CAPTAIN BEACH: Every time you are in the simulator, it is recorded that you were there.

CAPTAIN LIDELL: It could be interpreted by someone that he was kept over for additional training.

CAPTAIN CAVANAGH: When a man goes through transition training, and it is projected to take a total of six periods and he takes ten periods; it is in the record. There is no free ride.

CAPTAIN NORMAN: I think that the critique that is used with this type of training should be left up to each individual airline as it fits into their own style of training. Regulatory actions should not be involved in this area. Generally speaking, you certainly have my support and that of the pilot group, but each individual airline should handle their own problems of this nature.

DR. LAUBER: I would like to add just one comment about the point Jim Michaels made which started this discussion. In regard to the example about someone inadvertently shutting down the wrong engine and the implications of having to suffer the consequences of someone else's actions; often, that kind of

situation is a reflection of the atmosphere in the cockpit at the time it occurred. We have observed this pattern in the full-mission simulation work that we have done. Frequently, we find that the captain or first officer had not paid sufficient attention to the workload on the flight engineer. It is often a reflection of the captain's management style. I have seen flight crews, before they take a critical action like shutting down an engine, say, "Okay, we're shutting down number one--do you want to check me on that?" These situations very often reflect the lack of that type of coordination. I also feel that the concentration on these types of factors in the debriefing can represent a very valuable learning experience. Even though one person might have directly committed the error, more often than not, everyone has contributed to it.