

STATEMENT OF RAYMOND G. BELANGER, DIRECTOR, AIR TRAFFIC SERVICE, FEDERAL AVIATION ADMINISTRATION, BEFORE THE HOUSE COMMITTEE ON GOVERNMENT OPERATIONS SUBCOMMITTEE ON GOVERNMENT ACTIVITIES AND TRANSPORTATION ON AIR TRAFFIC SYSTEMS ERRORS INVOLVING HUMAN FACTORS, MARCH 9, 1976.

Mr. Chairman and Members of the Subcommittee:

I am Raymond Belanger, Director of the Air Traffic Service for the FAA. Accompanying me today is Dr. H. L. Reighard, the Federal Air Surgeon, Mr. John Ryan, Chief of the Cleveland Air Route Traffic Control Center (ARTCC) and John F. Wubbolding, Chief, Air Traffic Division, Great Lakes Region.

You have asked us to appear today to discuss the role of human factors in air traffic system errors. In addition you have asked us to comment on the National Transportation Safety Board's (NTSB) Aircraft Accident Report on the near mid-air collision of November 26, 1975.

The Administrator, Dr. John L. McLucas, has appeared before this Subcommittee last December to discuss the problem of near mid-air collisions in general. Dr. McLucas outlined the FAA program effort to prevent near mid-air collisions and emphasized upgraded and improved equipment the FAA would be installing. As he indicated then, the conflict alert function is now operational at all en route centers. However, the Administrator pointed out "Of course, whenever you have a system based on both automated and human factors the possibility of human error is always present." Today I would like to concentrate on the area of human factors in our air traffic control system.

As I am sure the Subcommittee is aware our air traffic control system is the safest in the world. The FAA is committed to making the system safer whenever possible. One way we do that is by studying and evaluating problems when they arise. We initiated a comprehensive and effective program to coordinate our evaluations of system errors. Out of those evaluations comes corrective action and remedial recommendations. You can see how this process works in FAA Order 8020.3A "The Air Traffic System Error Reporting Program." A copy of this Order has already been provided to the Subcommittee Staff but I have another with me which I would be pleased to submit for the hearing record. In the Order the FAA policy is stated "...that the only effective means of reducing error occurrence is to identify and correct the causes of the failure, human or otherwise, which lead to system errors."

Before I describe in detail our procedures I should explain what a system error is. A system error is an operational error in which a failure of the equipment, human, procedural and/or other system elements results in less than the appropriate separations minima. What is the proper minimum varies depending on the circumstances. You realize that most system errors don't mean there is a safety hazard. The minima we establish leave a wide safety margin. Let me now describe what happens after a system error has occurred under our procedures. Operational errors or suspected errors that occur in Air Traffic Service facilities are immediately reported to both Regional and Washington Headquarters. Additionally, the Chief of the facility immediately designates a team to

analyze and reconstruct the actual or suspected error and telephone a preliminary analysis of their investigation to Washington Headquarters within six hours of the occurrence.

The Air Traffic Controllers who appear to be directly involved are temporarily relieved of operational duty immediately following discovery of the error. This initial removal is not considered to be disciplinary or punitive action. The removal is to permit the immediate preparation of facts and supporting data for facility investigation. In the event human error was involved the removal affords further protection.

Air Traffic Control Specialists relief from operational duty remains in effect until facility supervisory personnel have determined the extent, if any, of the employee's involvement.

If the employee was responsible for or contributed to a system error, the following actions must be taken as a minimum prerequisite to re-assignment to operation duty.

1. A discussion with the employee including a detailed and complete review of the incident including circumstances attendant to the occurrence.
2. Re-evaluation of the employee on the position of operation to determine the necessity for additional training. If retraining is required, it will be conducted with emphasis on the weaknesses revealed during the investigation of the error.

Satisfactory completion of the two items above will be considered a re-certification of control ability.

Disciplinary action, when warranted will be taken, consistent with penalties for offenses of comparable gravity found in FAA Conduct and Discipline Handbook 3750.4.

The facility must hold a system error review board which is charged with an in-depth full scale investigation of the incident. The Review Board is required to make their report within 15 working days of the occurrence. The facility chief must review the facility boards findings and submit his concurrence of the board's report or justify nonconcurrence. Also the facility chief will report the actions taken locally to prevent a recurrence. The Facility Review Board's Report along with the facility chief's comments are reviewed at the Regional and Washington Headquarters level. These reports are analyzed at both levels to indenify trends and initiate actions needed to preclude recurrence.

Before moving on I'd like to touch on the frequency of systems errors.

For the last six years we have compiled the following statistics:

	<u>At EnRoute Facilities</u>	<u>At Terminal Facilities</u>	<u>Total</u>
1970	179	101	280
1971	185	96	281
1972	157	156	313
1973	140	148	288
1974	177	163	340
1975	245	179	424

To put this in some perspective this is out of total traffic for those years as follows:

1970	76,685,367
1971	75,385,434
1972	75,318,448
1973	79,902,785
1974	80,832,595
1975	83,579,971

In more understandable terms that means a controller will be involved in an error every 42 years or one error for every two million control instructions. Most controllers never are involved in a system error.

Now, I would like to address the NTSB report on the near mid-air collision of last November. Issued in conjunction with the report was a safety recommendation number A-76-3. The NTSB recommended to the FAA that we distribute the report to all FAA Air Traffic Control personnel and discuss it in our training program.

I can report to you Mr. Chairman that the FAA is in complete agreement with this recommendation. We are moving speedily to implement it. Specifically we are taking the following actions:

1. Information contained in the report has been included in the National Training Program conducted at Oklahoma City.
2. A video tape briefing aid is in production for distribution to all Air Traffic facilities with video replay systems. A mandatory briefing will be given in every facility as well.

3. Copies of the Report will be distributed to all Air Traffic Controller personnel.

There is one small comment on the NTSB report I would like to make. The report speaks of "the high percentage of human failures in the ATC system". To avoid any misconception I believe what was meant was the high percentage (about 93%) of system errors that involve human factors. It should not be understood that there is a significant percentage of human failures in the ATC system overall.

You have also requested that we discuss the specific actions taken by the FAA as a result of this particular accident. I hope you appreciate that while we share your desire that the facts be known we wish to respect the privacy of the individuals concerned. Therefore, my associates and I intend to refer to the individuals involved in the same manner as the NTSB - Radar Controller No. 1 and Radar Controller No. 2. There has already been too much personalized publicity about the controllers involved. Publicity that serves no useful purpose whatsoever. I am sure Mr. Chairman that you and this Subcommittee share our concern.

Radar Controller No. 1 was the controller the NTSB found to have failed to apply the prescribed separation minima and who was distracted by secondary duties. Radar Controller No. 2 was his relief and the controller who cleared the American Airlines aircraft for immediate descent.

After the near collision, Radar Controller No. 1 was temporarily relieved of duty to begin to write his reports of what happened. He had previously scheduled annual leave over Thanksgiving and took the time off. When he returned he did not work an operational sector but was detailed to the training department. After the NTSB hearing, he reported for duty and was assigned as the "D" man, the manual controller. He was under very close "over the shoulder" monitoring. He was supervised the way we would treat a developmental or controller-trainee. He progressed subsequently to the point where he began to work the radar-tracker position, still under close supervision. As his supervisors were satisfied with his performance he was ultimately allowed to work independently with normal supervision. This occurred over a three-week period. At this time the controller indicated that he had no problems associated with actually controlling traffic - in fact his performance was errorless. However, he indicated to his supervisors that off-duty he was troubled by the accident and its aftermath. Consultations were held with the Assistant Regional Flight Surgeon at the Cleveland Center. The controller was referred to a private physician and is presently on sick leave. Radar Controller No. 2 is back on regular duty.

I would like to generalize a bit about what is appropriate action to take vis-a-vis controllers involved in system errors. As I stated earlier they are infrequent - they might be characterized as random

phenomenon. Since they are so isolated it is difficult to generalize about what "disciplinary" or remedial action is appropriate in any specific instance. Each controller has a different history and different levels of experience. There can be no hard and fast rule that - say 2 system errors in six months period and we lift their air traffic controller certificate. There can be a variety of reasons why a controller gets involved in a system error. Some deficiencies in a controllers performance are correctable by retraining. Other controllers may not be able to work flawlessly in high density centers and towers - they should be transferred elsewhere where they can perform in perfect safety. The point is that we must examine each situation case by case. And when I say "we" I do not mean the staff at FAA Headquarters in Washington. It is the immediate supervisors of the controllers and their associates who can provide the best assessment of a controllers ability to perform after involvement in a systems error. They can most easily detect operational difficulties or behavioral changes. Therefore, it is on the supervisor's judgment that we rely most in deciding what is appropriate action.

Recognizing that we cannot eliminate human errors we are working to minimize them. One way is to try to develop automated equipment that removes from the human tasks which which most likely produce human error. We have done that by improving the radar equipment which identified the radar target. Today, we have Radar Data Processing so that a computer puts the tags on the targets. Another

kind of approach which we can take is to minimize the risk that a human error will result in a system error. In other words, we can try to catch the error before it goes too far. This kind of system is illustrated by our Conflict Alert Function.

The Conflict Alert Program was designed to meet three objectives. The first and most important was to alert the controller to a potential problem, which could result in a mid-air collision, in time for the controller to take action to avoid such an occurrence. It was also intended to alert the controller to a potential conflict between the two aircraft in time for instructions to be issued to the pilot and accomplished in a manner which does not require abrupt evasive action which might result in injury to passengers or aircraft damage. The third but lesser goal was to alert the controller in time to take action to prevent one aircraft from intruding into the protected airspace of another aircraft.

We believe that had Conflict Alert been operational at the Cleveland Center on November 26, 1975 the near collision between the airliners would not have taken place.

Before I conclude Mr. Chairman I would like to comment on the role of the medical personnel of the FAA in minimizing human errors in our Air Traffic Control system.

The medical effort begins with the development of selection criteria, in terms of aptitude and emotional stability. It also involves pre-hire and annual medical evaluations. In each of our Air Route Traffic Control Centers we have an Assistant Regional Flight Surgeon who, among other things, is available for counselling and initial treatment of on-the-job illness or injury. This would include post-incident medical assistance as needed in individual cases.

In addition to the clinical approach which I have described, there is an FAA medical research program, a significant portion which deals with the air traffic control system in areas such as controller stress, effects of shift rotation, improved selection criteria, effects of age on performance, causes for health change, etc.

This concludes my prepared statement, Mr. Chairman. My associates and I will try to address any questions you might have. I would like to offer for the record handbooks and manuals which discuss in greater detail the subject of system errors.

Thank you very much.