Runway Safety

Testimony of

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INTRODUCTION

The National Air Traffic Controllers Association (NATCA) is the exclusive representative of over 14,000 air traffic controllers serving the Federal Aviation Administration (FAA), Department of Defense and private sector. In addition, NATCA represents approximately 1,200 FAA engineers, 600 traffic management coordinators, 500 aircraft certification professionals, agency operational support staff, regional personnel from FAA's logistics, budget, finance and computer specialist divisions, and agency occupational health specialists, nurses and medical program specialists. NATCA's mission is to preserve, promote and improve the safety of air travel within the United States, and to serve as an advocate for air traffic controllers and other aviation safety professionals. NATCA has a long history of supporting new aviation technology, modernizing and enhancing our nation's air traffic control system, and working to ensure that we are prepared to meet the growing demand for aviation services.

EXECUTIVE SUMMARY

A host of independent federal watchdogs have recently warned that the Federal Aviation Administration (FAA) should be concerned with issues impacting aviation safety.

- The National Transportation Safety Board (NTSB) recently added runway incursions and incidents caused by air traffic controller fatigue to their 2008 List of Most Wanted Aviation Improvements.
- In November of 2007, the Government Accountability Office (GAO) issued a report that warned of "a high risk of a catastrophic runway collision occurring in the United States."
- The Department of Transportation's Inspector General, on the heels of near-collisions on runways at O'Hare, launched an investigation into the role that workplace conditions played at FAA facilities in Illinois.

The National Air Traffic Controllers Association (NATCA) offers the following recommendations specific to the issue of runway safety.

1. **Local Airport Committees for Runway Incursion Prevention**
   - It is imperative that each airport has the opportunity to employ a set of solutions that address specific local issues. Therefore, NATCA recommends that we establish Runway Incursion Prevention Committees for each airport throughout the country that would be run and structured on the level of the individual airport. These groups would be composed of representatives from the local stakeholders, including Pilots, Air Traffic Controllers, Airport Management, and Airport Vehicle Drivers as well as a national representative from the FAA.

2. **Proper Staffing of Air Traffic Control Towers**
   - It is also important that we address at the national level those system-wide problems which occur most frequently and whose effects are most detrimental to runway safety. First among these system-wide problems is the understaffing of Air Traffic Control Towers. The first step to relieving the staffing shortage and

alleviating controller fatigue is to stem the flow of Air Traffic Controllers out of the FAA workforce. Therefore, NATCA recommends to this committee that the FAA be instructed to return to the bargaining table to bargain in good faith with NATCA and produce a ratifiable agreement for the Air Traffic Controllers. This gesture of good faith, combined with the removal of some of the more heinous provisions of the imposed work rules, will make staying in the FAA workforce more attractive to both newly hired Controllers and those eligible for retirement, slowing the rate of attrition.

3. **Technology and Modernization**

- *Collaboration:*
  When NATCA and the FAA worked collaboratively on modernization projects through the Liaison Program, they were able to successfully identify the technological needs of the Air Traffic system and develop and deploy the technology to meet those needs. Unfortunately this collaborative program with the controllers was disbanded in 2003 by the FAA.
- *ASDE-X:*
  NATCA recommends that surface radar, whether ASDE-X or a low-cost surface surveillance system, be installed at all airports throughout the country with mid to high traffic density. Air Traffic Controllers should be given the opportunity to provide feedback and guidance on the local level during the implementation and deployment of the technology.
- *Additional Technologies:*
  NATCA recommends that each of the following technologies: Runway Status Lights, Data Link Systems, and Taxiway monitoring systems be tested and adapted for use in the U.S. airport environment. Testing should be done swiftly, efficiently and cooperatively, and once completed, the technologies should be implemented at all major airports.

4. **Runway Crossing**

- *End Around Taxiways:*
  Runway incursions commonly occur when the layout of taxiways force aircraft to cross a runway in route to a second runway or the gate. Therefore it is NATCA's final recommendation to this committee that End-Around Taxiways be constructed and utilized at all airports where such construction is possible.

RUNWAY SAFETY

Runway incursions are not, as they may seem, a single problem that can be addressed with a single solution. Runway incursions are the unfortunate manifestations of many obstacles working in tandem to create unsafe situations at the nation's airports. These obstacles include: airport design, controller fatigue, frequency congestion, understaffing, poor visibility, equipment limitations, and an emphasis on system efficiency and capacity over safety. The following recommendations address each of these obstacles.

Local Airport Committees for Runway Incursion Prevention

The causes of runway incursions are often as specific and local as lighting, signage and an airport's unique taxiway layout. Thus it is imperative that each airport has the opportunity to employ a set of solutions that address these specific local issues.

At the Atlanta Hartsfield-Jackson Airport for example, runway incursions are often caused by confusion relating to hold-short lines for two parallel runways, Runway 26R and Runway 26L, which are separated by less that 2500 feet. An aircraft located on the North side of 26R may be instructed to cross runway 26R, but hold short of 26L. Instead of stopping at the northern hold short line for 26 L, an aircraft may stop at the southern hold short line for 26R. The mistake is easy to make, as these two lines are very close together. However, holding short at the wrong line may mean that a larger aircraft is stopped where its tail is not clear of the first runway.

Lexington Airport, which has no parallel runways, could not experience this same confusion. However, an aircraft leaving the gate at Lexington via taxiway Alpha to depart from runway 22 needs to pass by the entryway of runway 26 before reaching its destination. A pilot, realizing he is approaching the entryway of a runway may mistakenly believe he has already reached runway 26 and try to depart from the incorrect runway. This scenario was one of the contributing factors that led to the accident at Lexington Airport in August of 2006.

The solutions for Lexington Airport, therefore, differ significantly from those for Atlanta, just as solutions for each airport will differ from every other. Even those airports that experience common challenges due to, for example, similarities in climate, experience them differently as these challenges interact with airport layout and traffic patterns.

Yet this does not create an insurmountable task. Each airport has a set of local experts: the Air Traffic Controllers, Pilots, Tug Drivers, Traffic Management Coordinators, Engineers, airport authorities, local management and other aviation safety professionals who work there every day. Through their first hand experience, these local professionals are able to identify runway incursion "hot spots." They have witnessed breakdowns of communication, inadequate procedures, and failures of airport markings. They have learned when and where visibility becomes limited and have devised methods of coping with these limitations. They know the optimal runway configurations, are familiar with the weather and traffic patterns, and have experienced the technological glitches as well as the successes. These experts possess a wealth of knowledge that would be an invaluable asset to the process of minimizing runway incursions.

Therefore, NATCA recommends that we establish Runway Incursion Prevention Committees for each airport throughout the country that would be run and structured on the level of the individual airport. These groups would be composed of representatives from the local stakeholders, including Pilots, Air Traffic Controllers, Airport Management, and Airport Vehicle Drivers as well as a national representative from the FAA. They would meet monthly to identify specific local causes and contributing factors to runway incursions and to posit potential solutions to those problems. This would be the full charge of each meeting, until such time as solutions have been established. These groups would reconvene during the implementation phase in order to fine-tune the solutions and deal with any complications that arise during execution.

Proper Staffing of Air Traffic Control Towers

It is also important that we address at the national level those system-wide problems which occur most frequently and whose effects are most detrimental to runway safety. First among these system-wide problems is the understaffing of Air Traffic Control Towers.

In 1998, NATCA and the FAA jointly authorized a level of staffing for each Air Traffic Control facility throughout the country, based on scientific studies that identified the number of controllers necessary to maintain the National Airspace System (NAS) safely and efficiently. As of January 5, 2008, the NAS is operating with only 70% of the authorized number of controllers. At many of the major airport towers, the numbers are even more staggering: McCarran Airport in Las Vegas is authorized to employ 57 Certified Professional Controllers (CPCs), but as of last month had only 27. At LaGuardia, there are 22 CPCs instead of the 36 that were authorized, and at Philadelphia International Airport there are 70 CPCs instead of the authorized 109.[1]

This understaffing leads to mandatory overtime for controllers, who are often called upon to work 10 hour days and six day weeks to cover these short shifts. In December 2007, the Government Accountability Office released a report that found "at least 20 percent of the controllers at 25 air traffic control facilities, including towers at several major airports were working 6 day weeks." Excessive overtime causes fatigue among controllers, and therefore increases the likelihood of mistakes being made. The National Transportation Safety Board listed the reduction of "accidents and incidents caused by human fatigue" among their 10 most wanted improvements to aviation safety, and the GAO report identified controller fatigue as a major cause of runway incursions, stating, "Air traffic controller fatigue continues to be a human factors issue affecting runway safety."

Overtime is not the only cause of controller fatigue. In addition to working longer days and weeks, controllers must also work on short-staffed shifts. On a short-staffed shift, a controller has to work more time on position with shorter and less frequent opportunities for rest. On such a shift, controllers at radar positions are often forced to work without a radar assistant, as there are not enough controllers to cover these duties separately. A controller working without an assistant is responsible not only for communication with aircraft, but also coordination with other controller positions and entering flight progress information. Short-staffed shifts also frequently combine positions, forcing a single controller to work, for example, both ground control and local control, creating increased frequency congestion and an increased risk of runway incursions. The increased complexity and workload can also lead to less situational awareness, meaning that a controller is less likely to realize pilot error in time to prevent runway incursions.

Atlanta Hartsfield-Jackson Airport is a prime example. The GAO report found that 52% of that tower's controller workforce regularly worked 6 day weeks. The GAO report also cited 30 runway incursions at Hartsfield-Jackson Airport in the past four years, the fifth most of any U.S. airport. There were 11 controller errors at ATL in 2007, including one involving a Delta flight that blew out its tires while aborting a takeoff into incoming traffic headed to an adjacent, parallel runway. Both controllers involved in that incident

[1] All staffing information is based on data supplied by the FAA to NATCA in accordance with provisions of the Imposed Work Rules. Data is current as of January 5, 2008.

had recently worked overtime shifts. More recently, on January 13, 2008 a Delta Airlines Boeing 757 almost collided with a commuter jet when it crossed over the runway in front of the Boeing. The 757 was accelerating on a takeoff roll, and traveling over 100 mph. The Delta B757 was not able to stop, and the commuter jet expedited their taxi, avoiding a collision by only seconds.

A similar story can be told at Los Angeles International Airport, a facility where controllers must work an average of 2.3 overtime shifts a month to compensate for staffing shortages. Last August, two aircraft carrying close to 300 people stopped within 37 feet of each other there. As of January 10, 2008 this tower has had 18 close calls. Today there are only 33 controllers working in the tower, down from 46 in past years when there were fewer close calls.

Short-staffing at smaller airports means that there may only be one controller on duty who is responsible for all operations and controller-pilot communications at that airport. In August 2006, management at Lexington Airport violated FAA guidelines and left a single controller responsible for all ATC operations and responsibilities. As a result, he failed to notice the Pilot of ComAir flight 5191 deviated from his instructions and entered the wrong runway, resulting in the death of 49 passengers. NATCA is concerned that short staffing scenarios such as this are being recreated throughout the country. On December 4, 2007, for example, a controller at Syracuse Tower was forced to work a 13 hour 40 minute shift when another controller suffered an injury and no others were available for overtime due to understaffing.

The shortage of air traffic controllers nationwide is a direct result of attrition caused by FAA implementation of the imposed work rules (IWR) in September of 2006. The agency's refusal to fairly negotiate a fair labor agreement with NATCA caused, and is continuing to cause, unprecedented attrition from the ATC workforce. The FAA missed their total attrition projection for fiscal year 2007 of 1,197 by 425 when 1,622 controllers and trainees left – working out to an average of 4.4 controllers leaving the workforce per day. As of January 5, 2008, three months and five days into the new fiscal year, the total workforce attrition was 603, or 6.2 controllers per day – putting the country on track to lose 2,269 in total attrition by the end of the fiscal year.

Much of this attrition is attributable to an increase in controller retirements. So far this fiscal year, there have been over 316 retirements, only 8 of which occurred when an individual reached the mandatory retirement age. Each of these retiring controllers represents over 20 years of invaluable experience, and they are leaving the ATC workforce with time still left on the table. As these experienced controllers leave, the next generation of air traffic controllers is left without the proper training and mentoring they require to in order to learn to work air traffic safely and efficiently. Additionally, the system depends increasingly on inexperienced controllers and on individuals who have not yet achieved full certification to work control positions. At Seattle Tacoma International Airport, for example, if every controller who is eligible to retire by the end of FY2008 does so, they will have only 11 controllers with more than 1.5 years of experience.

The first step to relieving the staffing shortage and alleviating controller fatigue is to stem the flow of Air Traffic Controllers out of the FAA workforce. Therefore, NATCA

recommends to this committee that the FAA be instructed to return to the bargaining table to bargain in good faith with NATCA and produce a ratifiable agreement for the Air Traffic Controllers. This gesture of good faith, combined with the removal of some of the more heinous provisions of the imposed work rules, will make staying in the FAA workforce more attractive to both newly hired Controllers and those eligible for retirement, slowing the rate of attrition.

Technology

Repairing the relationship between the FAA and the Controller workforce would have positive implications for safety beyond stemming the flow of controllers from the workforce. Working together, NATCA and the FAA have been able to successfully identify the technological needs of the Air Traffic system and develop and deploy the technology to meet those needs. Some of the most successful initiatives of the now-defunct liaison program were the development of certain technologies that could – if widely and properly implemented – combat some of the most common deficiencies that lead to runway incursions.

ASDE-X, the current state-of-the-art surface radar, is the perfect example. ASDE-X is designed to combat visibility limitations of tower controllers by providing radar-based visualizations of the position and movement of aircraft on the ground and in the air within 5 miles of the airport. This is particularly valuable at night and during inclement whether when visibility from the tower is limited. By taking input from radar sources in several different locations around the airport, ASDE-X has been able to reduce coverage gaps and false targets that plagued some of the predecessor technology.

As of today, surface radar has been implemented at only eleven airports. The FAA has created a list of 35 airports that should receive the technology by 2010. While NATCA applauds the implementation of this technology at these airports, the FAA has not gone far enough. Lack of visibility poses a threat to runway safety at all airports, not only the 35 busiest.

It is also vitally important that Air Traffic Controllers be consulted locally during the implementation process in order to avoid or quickly resolve technological glitches. For example, the ASDE-X at Chicago O'Hare (ORD) has six portions of the non-movement area where radar coverage has been blocked. This action was taken without coordination or input from the Air Traffic Controllers. Even though these blocked areas are not on taxiways or runways, coverage of these areas would give Controllers greater insight into airport activity and allow them to more accurately track and predict aircraft movement. Cooperation in this endeavor would allow the users of this technology to fine-tune the installation in order to maximize the utility of ASDE-X according to their specific needs.

Accordingly, NATCA recommends that surface radar, whether ASDE-X or a low-cost surface surveillance system, be installed at all airports throughout the country with mid to high traffic density. The process should begin by expanding the list of 35 airports to include the 60 busiest airports, so that they may receive this technology in the near term. Air Traffic Controllers should be given the opportunity to provide feedback and guidance on the local level during the implementation and deployment of the technology.

In addition to ASDE-X, there are other pre-existing technologies available that would help combat causes of runway incursions. These include: Runway Status Lights to combat controller-pilot miscommunication and taxiway monitoring systems to cut through operational complexity. Controller Pilot Data Link Communication (CPDLC) should be modified for surface operations to reduce frequency congestion.

Runway status lights function by alerting pilots as to whether a runway that they are about to enter or cross is currently occupied. These lights have an appearance similar to that of ordinary traffic lights. When a runway is occupied, the runway status light would show a red stoplight that would warn a pilot not to enter.

Runway status lights would serve as an additional line of defense in cases of miscommunication between Air Traffic Controller and pilot. Pilots unfamiliar with the layout of particular airports may misunderstand instructions given by Controllers, and taxi to an incorrect runway, resulting in an incursion. Additionally, Air Traffic Controllers frequently issue clearances to pilots instructing them to taxi to the intersection of a runway, but to "hold short" of the runway itself. Often, a pilot will see that a runway is not occupied and infer the next step of the Air Traffic Controller's instructions, neglecting to first hold short of the runway. Most often, this action is harmless. However, if the runway in question is occupied, it could result in a runway incursion. Runway status lights would serve as an additional warning to pilots, and provide an opportunity for corrective action prior to the occurrence of a runway incursion.

Frequency congestion is another problem that can be at least partially alleviated by existing technological solutions. An Air Traffic Controller is responsible not only for delivering the correct clearance to each pilot, but also for confirming that each pilot reads back the clearance correctly. At a busy airport, a controller is responsible for monitoring and responding to many different communications on multiple frequencies from a number of different pilots simultaneously. Sometimes a frequency can become so congested that a pilot's communication may not come through at all. Controller Pilot Data Link Communication (CPDLC) was a program that would have allowed controllers to issue routine clearances and other instructions to pilots via data transfer. Although it has never been developed for use in the terminal environment, this new system could be adapted to provide a visual readout of taxi instructions for pilots, eliminating the need for read-back monitoring and minimizing the opportunity for miscommunication. This technology would function much like the GPS systems used by many automobile drivers. A controller would input a pre-coded route, and the device would then issue step by step instructions to the pilot based on that route and the pilot's position.

Technology can also be utilized to enhance a controller's situational awareness, particularly when issues of short-staffing increase the complexity of an individual Controller's operation. Taxiway monitoring systems, for example, have been deployed at airports in India. These work as follows: Common taxi routes are coded at each airport. The controller then instructs the pilot to follow, for example, the green taxi route. When that command is given it is also entered into the monitoring system, which would immediately alert the controller if the pilot deviates from the assigned route. This would help a controller maintain situational awareness, particularly at busy times, or when inclement weather or other mitigating circumstances increases the complexity of the ATC operation.

NATCA, therefore, recommends that each of these technologies: Runway Status Lights, Data Link Systems, and Taxiway monitoring systems be tested and adapted for use in the U.S. airport environment. Testing should be done swiftly, efficiently and cooperatively, and once completed, the technologies should be implemented at all major airports. As with ASDE-X, NATCA believes that it is important for the users of this technology – Air Traffic Controllers and Pilots in particular – be consulted throughout the testing and implementation process in order to maximize the benefit of the technology.

Minimize Runway Crossings

Runway incursions commonly occur when the layout of taxiways force aircraft to cross a runway in route to a second runway or the gate. Many airports with multiple runways are constructed so as to frequently require pilots to make this dangerous maneuver.

Los Angeles International Airport (LAX), for example, has two sets of parallel runways: Runway 24L and 24R and Runway 25L and 25R. In order for an aircraft that has landed at 25L to reach the gate, it must first cross 25R. Similarly, an aircraft that has landed at 24R must cross 24L in order to reach the gate. Though aircraft taxiing to and from the more distant runways should be instructed to hold short before being cleared to cross the nearer runway, these intersections are still runway incursion hot-spots.

In order to combat this problem, some airports have constructed End-Around Taxiways. These are additions to current taxiways that allow an aircraft to detour around the end of a runway rather than cut directly across it. Atlanta Hartsfield-Jackson Airport, for example, unveiled a new end-around last spring that allowed aircraft landing on runway 26R to reach the gate without crossing runway 26L, which runs parallel. By doing so, they were able to eliminate more than 600 runway crossings per day according to FAA data.

The construction of End-Around Taxiways is not a simple proposal. It requires the usurpation of land, a valuable resource that is often scarce, particularly in airport areas. Runway safety requires that some land be set aside for runway overruns, or areas that provide additional space for aircraft to stop in the event of a runway overshoot. These spaces help diminish the collateral damage incurred in these events and help protect the communities surrounding the airport. End-Around construction may be forced, in some situations, to compete with these buffer zones for land, and in these cases an assessment must be made based on which provides the greatest safety benefit.

The key to the success of End-Around Taxiways does not lie simply with their construction, though that is the clear first step. In order for these to be effective in the reduction of runway incursions they must be regularly utilized. Using the End-Around Taxiway instead of crossing runways lengthens the taxi route, sometimes by over a mile. Although it is never the intention of any aviation professional to be involved in a runway incursion, pilots also feel pressure to conserve both time and fuel. It is therefore important to remember that safety must always be the first consideration, even when it is at odds with the maximization of efficiency.

Therefore it is NATCA's final recommendation to this committee that End-Around Taxiways be constructed and utilized at all airports where such construction is possible.

These taxiways must be built at a lower altitude than the nearby runway so that the tail of the aircraft on the taxiway will be below the obstruction zone for the departure runway.

CONCLUSION

The National Air Traffic Controllers Association believes each of these recommendations should be acted on by the Agency to ensure that aviation safety is not only preserved, but improved upon. NATCA offers its expertise and resources to aid the Agency in their implementation of these recommendations on inclusion of frontline employees' expertise, implementation of specific technologies, and the minimizing of runway crossings. NATCA's warning on controller staffing has been consistent and clear: When there are fewer, more tired eyes watching more planes, safety suffers. The Agency must properly staff towers and correct the unjust imposed work and pay rules that have aggravated an already existing staffing problem.

Our hope is that the FAA will change course and be interested in the solutions as well as the participation of the men and women that make our National Airspace System the safest and most efficient in the world.