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STATEMENT OF WILLIAM R. VOSS, PRESIDENT AND CEO, FLIGHT SAFETY FOUNDATION

BEFORE THE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE,

SUBCOMMITTEE ON AVIATION,

ON JUNE 6, 2007

Chairman Costello, Congressman Petri and Members of the Subcommittee:

Thank you for the opportunity to appear before this committee and discuss aviation safety and the National Transportation Safety Board's Most Wanted Aviation Safety Improvements list. The Flight Safety Foundation appreciates the effort of the NTSB to raise awareness and try to inspire action through its expertise.

The Flight Safety Foundation was founded 60 years ago by leaders in the industry to address the problem of how to identify and solve safety issues. They believed that the industry needed a neutral ground where competitors could work together to share information, ideas and best practices for safety.

Our membership is over 1,100 and includes all segments of the aviation industry. We bring unions and management, regulators and operators, and rival manufacturers to the table so they can work together to find solutions. Moreover, the Foundation is nearly unique because of its international membership, which allows the many organizations that strive to improve flight safety standards and practices throughout the world to coordinate their efforts. Effectiveness in bridging cultural and political differences in the common cause of safety has earned the Foundation worldwide respect.

The one constant over the past 60 years has been the understanding that the industry *cannot* compete on *safety*. When there is a crash or a serious incident, the entire industry is affected, not just the particular airline or manufacturer. The air transport industry is a global enterprise — a single flight can cross the borders of several countries and continents. The Foundation, with members from 142 nations around the globe, transcends local, regional or national political interests.

Extraordinary Improvements in Aviation Safety Continue

Before beginning a discussion on improving safety in aviation, it is important to acknowledge how far this industry has come. If we had the same accident rate today as in 1996, there would have been 30 major commercial jet accidents last year. There were 11. That is a remarkable achievement, especially when considering that it is increasingly difficult to improve on a system

that is progressively safer, and continually growing. It is also remarkable to consider the number of lives that have been saved. To keep up that sort of progress, all of us in the aviation industry have to re-evaluate and challenge our approach to safety improvements.

Multiple Approaches Drive Increasing Safety Levels

The oldest and most venerable safety tool in aviation is the science of accident investigation. Accident investigations were basically the only source of safety improvements for several decades after World War II. The investigations identified causes and made findings and recommendations. The purpose of these recommendations was to avoid recurrence of accidents involving the same causes. This is what the NTSB does better than anyone in the world. Objective accident investigations will always be an essential part of the safety equation, but today they are only part of a more complex picture.

Today, aviation safety professionals have much more to work with than accident reports. They have adopted a more proactive safety management approach. They identify risk and prioritize actions by downloading and analyzing data from normal flights. They use reporting systems that allow pilots, mechanics and others to report problems that would normally go unrecorded or unrecognized. Studies show that this type of data will indicate several hundred anomalies that could be a factor in a serious accident or incident.

This information identifies latent risks and leads to proactive actions that drive risk down by making the system more resilient. We don't have to wait for a crash to act. When one risk is mitigated another rises to the surface and the process begins again.

Differing Perspectives Are Inevitable, But Continued Action Is Essential

One difficulty is that different approaches to safety can sometimes reach different conclusions. Accident investigators will urge that recommendations are followed so that the possibility of that particular type of accident recurring is minimized. Safety practitioners who are trying to balance the overall risk of the system will gladly follow these recommendations until data shows that there are higher risks elsewhere that need to be prioritized.

Neither viewpoint is wrong, because both types of input are necessary. Investigators must always tell us how to minimize the possibility of a crash. Safety professionals must always take this information seriously and use it together with all the other available information to target the things that are most likely to cause the next crash.

The Proactive Approach of Safety Management Is the Key to Meeting Future Safety Challenges

This new approach to safety saves lives by focusing attention on those items likely to cause the *next* crash. Accident investigations focus attention on what caused the *last* crash. In a safety management approach, information comes from monitoring the product of reporting programs built on a foundation of trust and commitment.

Safety management is now the main driver of aviation safety. It functions quietly in the background outside the view of the public and the press, but if it were to be compromised the consequences would be unbearable. We cannot go back to a time where lives had to be lost

before safety issues were revealed. We must develop and then *protect* systems that alert us to risks before the crash.

The Safety Management Approach Is Vital, But It Is Also Vulnerable

Proactive safety management is built on a foundation of commitment and trust. If we lose that trust, the information flow ceases and we are condemned to wait for the next incident or accident. Trust is a difficult thing to maintain in the U.S. aviation environment. The industry and the regulator have been through difficult times and labor relations are strained. The Flight Safety Foundation takes no position on the political debates, but we do issue one caution: the debates between management and labor in this industry must *never* be allowed to compromise the free flow of safety information in the system. If information stops flowing from the cockpit, the ramp or the control room floor, risk will be needlessly increased.

NTSB's Most Wanted List

The NTSB's Most Wanted List has always been a valuable tool to highlight the risks as seen by the dedicated and professional accident investigators. But we must never forget that there is more information to be considered than what comes from the crash site. The Flight Safety Foundation will attempt to comment on these items from the broader safety perspective.

Eliminate Flammable Fuel/Air Vapors in Fuel Tanks on Transport Category Aircraft

The Flight Safety Foundation has not been directly involved in this difficult safety challenge but can offer a general perspective. A great deal of effort has been invested in the management of potential ignition sources. This may not be the ultimate solution to the problem but these actions were clearly good as immediate responses to mitigate risk. These actions have been followed by longer-term efforts to develop fuel tank inerting technologies. Our understanding is that this will be followed by FAA rule making requiring operators to reduce flammability levels. We believe that this layered approach has reduced, and will continue to reduce, the risk associated with fuel tank explosions.

Reduce Dangers to Aircraft Flying in Icing Conditions

Aircraft icing has been a dangerous and challenging problem since the early days of aviation. The Flight Safety Foundation pioneered the design of deicing technologies in the 1940s and published a special issue of *Flight Safety Digest* in 1997 devoted to the topic. Sections of "Protection Against Icing: A Comprehensive Overview" are still being reprinted in various magazines ten years after publication.

In the early days of aviation, when the pilot hand-flew the aircraft with mechanical controls, it was easier for the pilot to sense when the aircraft's performance was being degraded by icing. In today's world, aircraft spend much of the time on autopilot, and many aircraft rely on fly-by-wire systems. This tends to isolate the pilot from feedback from the aircraft as ice accumulates. The result can be a sudden loss of control or an unexpected, dramatic performance degradation.

Proposed rules addressing pilot training, aircraft handling qualities, and installation of icing detection and alerting systems should greatly reduce the risk posed by this constant threat.

Stop Runway Incursions/Ground Collisions of Aircraft

While there have been relatively few fatalities associated with runway incursions, it is impossible to ignore the number of incidents that have been reported. The NTSB recommendation focuses largely on the implementation of technologies that warn the pilot directly. This is clearly a valid approach since runway incursions happen quickly and there is little time for a controller to interpret the situation and issue warnings.

However, it would be advisable to broaden the solution set to keep attention on pilot awareness and training. A tremendous amount of training material intended to reduce runway incursions has been produced and distributed around the world, but it is not being fully utilized. A major European regulator conducted a survey of pilots to see if the information was being used and discovered that only 8 percent of the pilots surveyed had seen any of the multitude of runway incursion material available. There is work to be done while we wait for the technology to be deployed.

The NTSB may also wish to reconsider the scope of this issue. Runway incursions are a subset of the larger problem of runway safety.

During January 2007, the Flight Safety Foundation called a meeting to assess the overall state of not just runway *incursions* but also the larger question of runway *safety*. In our work we break the problem of runway safety into three components: runway *incursions* such as at Tenerife, runway *excursions* such as Southwest Airlines in Chicago, Air France in Toronto and Garuda in Indonesia, and runway *confusion* such as Comair in Lexington, Kentucky.

One of the findings of this meeting is that runway excursions presented a much larger threat than most had assumed. The accidents do not often result in mass fatalities, and therefore, they often get less attention. Nonetheless, the data suggest these accidents deserve more attention.

Table 1

**Runway Accidents 1995–2006
Resulting in Substantial or Greater Damage**

	Number	Percent
Incursions	10	0.8
Excursions	374	29.4
Confusion	4	0.3

Note: Data based on 1,270 turbojet and turboprop accidents.

Table 2

Runway Accidents 2002–2006 Resulting in Fatalities

	Accidents	Fatalities	Percent of Fatalities
Incursions	3	17	0.4
Excursions	13	283	7.1
Confusion	1	49	1.2

Note: Based on analysis of 512 turbojet and turboprop accidents (including 134 fatal accidents resulting in 3,944 deaths).

The Flight Safety Foundation would be pleased to work with the NTSB in broadening this item to address the full spectrum of runway safety threats to include runway confusion and runway excursion.

Improve Audio and Data Recorders/Require Video Recorders

It is clear that the data retrieved from audio and data recorders (and potentially video recorders) play a central role in the investigation of an accident. What is less commonly known is that these devices are increasingly used to gather data on normal operations. Many major airlines, and some corporate operators, extract data from digital flight data recorders to provide information about safety risks. They are able to identify abnormalities such as non-stabilized approaches that could lead to landing accidents. Some airlines currently use this data to identify crew fatigue issues.

That being said, the use of recorder data to prevent accidents is not unlimited. Flight recorder data can be used to identify risks in normal operation because it can be de-identified. It is more difficult to de-identify voice and video recordings. For that reason, it is likely these tools will only be able to serve accident investigation and will not play as large a role in accident prevention. When regulating new requirements for these devices, it will be necessary to balance investment made in post-accident investigation tools against investments made in accident prevention training and technology.

At this point the FAA has introduced rule making that would target some of the most important flight recorder upgrades that could be implemented at reasonable costs. Attention should also be paid to how existing flight recorder systems are being maintained and used.

In a paper presented to the International Civil Aviation Organization (ICAO) during March 2006, the NTSB recalls that investigations into five of the seven major crashes of 2005 were hampered by poorly maintained flight data recorders. The NTSB went on to confirm that “... oversight regarding flight recorder maintenance continues to be a worldwide airworthiness concern during accident and incident investigations.” Since 2006 the situation has only worsened. Developing States are not making the maintenance, or even the recovery, of flight data recorders a priority. The flight data recorder from the January 1, 2007 crash of Adam Air

574 still lies at the bottom of the ocean due the reluctance of the Indonesian government to pay for its recovery. The cause of that crash remains a mystery.

Flight data and voice recorders are essential to aviation safety. The U.S. Government should stress this point in appropriate international forums.

Reduce Accidents and Incidents Caused by Human Fatigue

In this area a broad consensus had developed, supported by mature science. Human error has long been identified as the leading cause of aviation incidents and accidents. Fatigue plays a major role in human error.

The aviation industry began setting hourly working limits for flight crews some three decades ago in an attempt to reduce the risk of fatigue. Addressing fatigue in aviation must include all sectors including the cockpit crew, cabin staff, maintenance personnel, air traffic controllers and ramp workers. A comprehensive program for these disciplines needs to include all factors that induce or increase fatigue.

Flight- and duty-time limitations and rest requirements traditionally have provided the regulatory basis for managing fatigue. The Flight Safety Foundation believes the best way to reduce fatigue among today's aviation workforce is through a non-prescriptive program which monitors fatigue. A system which goes beyond traditional flight- and duty-time regulations and incorporates a fatigue risk management system (FRMS) is essential for reducing the level of fatigue. FRMS provides alternative, scientifically based management of the risks associated with fatigue and can enable companies to safely conduct flight operations beyond existing prescriptive regulatory limits.

FRMS should be an integral part of a safety management system to ensure that employees' alertness and performance are not unacceptably reduced by fatigue. The purpose of an FRMS is to prevent errors, incidents and accidents in which to which fatigue contributes. FRMS is expected to improve safety, efficiency, productivity and operational flexibility while satisfying the company's duty of care to its employees as well as the regulator's to the public.

An effective FRMS would include a fatigue risk management policy, education and awareness training programs, a crew fatigue-reporting mechanism with associated feedback, procedures and measures for monitoring fatigue levels, procedures for reporting, investigating and recording incidents in which fatigue played a role, and processes for evaluating information on fatigue levels and fatigue-related incidents, implementing interventions and evaluating their effects.

FRMS, with appropriate regulatory oversight, should be considered an acceptable alternative to prescriptive flight- and duty-time limitations and rest requirements. For operators that choose this alternative means of regulatory compliance, the FRMS should become a required component of the safety management system.

Improve Crew Resource Management

In this area there is strong support from various segments of the aviation community. The recommendation supports introduction of crew resource management training into regulation

addressing the air charter industry. Crew resource management training is something that has been commonplace in the airline industry since the 1980s. Training providers that serve the corporate aviation community have voluntarily adopted it as well.

The original concepts of crew resource management training in the airline industry have evolved to include new concepts addressing Threat and Error Management (TEM). This addition gives the pilots strategies to manage risk as a team when problems and errors present themselves. This new TEM approach is actually the next generation of CRM.

The Corporate Advisory Committee of the Flight Safety Foundation is taking this training approach from the airline industry and moving forward aggressively. Efforts are under way to push this new type of training out to thousands of corporate pilots over the next year. Plans are also in progress to promote CRM and the new TEM training into the air charter community within the next few months.

A regulation that specifies CRM for air charter operators would be welcome. But it should not be a surprise if much of that industry has moved aggressively forward while such regulation is pending.

Conclusion

The aviation industry in the United States is in an enviable position. Through decades of work by the investigators, regulators, industry and other experts, the accident risk is one of the lowest in the world. This gives us all the opportunity and the luxury to dig deeper into the data from not only accidents and incidents, but also “successful flights,” and begin to address risk at levels beyond what is done anywhere else in the world.

At the Flight Safety Foundation, we like to consider the people walking around today whose lives were unknowingly saved by the hard work of the investigators of the NTSB, the regulators at the FAA, and the experts in industry who are constantly making a safe industry even safer.

Thank you very much for allowing me this opportunity to testify before you today. I would be happy to take any questions.