STATEMENT OF

CAPTAIN JOHN PRATER

PRESIDENT

AIR LINE PILOTS ASSOCIATION, INTERNATIONAL

BEFORE THE

SUBCOMMITTEE ON AVIATION

COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE

UNITED STATES HOUSE OF REPRESENTATIVES

WASHINGTON, DC
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RUNWAY SAFETY: AN UPDATE

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Good morning, Mr. Chairman and members of the Subcommittee. I am Captain John Prater, President of the Air Line Pilots Association, International (ALPA). ALPA represents 53,000 pilots who fly for 37 passenger and all-cargo airlines in the United States and Canada. On behalf of our members, I want to thank you for the opportunity to provide an update on the efforts of government and industry to enhance runway safety. While significant progress has been made, much work remains to be done. Today, I will address three runway safety topics: runway incursions; runway excursions; and runway confusion.

We are pleased that FAA has placed a greater emphasis on runway safety, which is evidenced by its "Call to Action" in August 2007 and follow-up thereafter. Pilots, controllers, airlines, and airport operators and international non-profit aviation safety organizations, such as the Flight Safety Foundation, have all contributed to improving safety through better signs, markings, training, and procedures. ALPA has done its part by publishing six runway safety newsletters for our members since January 2008 with four more to be published in the next few months. We have also created a special runway safety website which we use to educate and inform our members on best practices and ways to increase their vigilance during surface movements. These ALPA activities have contributed to a heightened awareness of runway and airport safety. We will continue to stress the need for awareness amongst flight deck crewmembers to ward off the potential for complacency.

Runway Incursions

The problem of runway incursions has been exhaustively studied by dozens of aviation experts and numerous, effective, mitigation solutions have been devised that can greatly lessen the inherent risk associated with airport ground operations. U.S. airlines safely completed 19.4 million flights in 2007. Of these, a few hundred experienced a runway incursion and most of those were not "close calls." FAA issued a report on runway safety in June 2008 which stated that the number of serious runway incursions has dropped by 55 percent since FY 2001. In 2007, there were 24 serious runway incursions

(Category A and B) during 61 million aircraft operations, down from 31 such incursions in FY 2006, and 53 serious incursions in FY 2001. Of the 24 serious incursions, only eight involved commercial flights. While these numbers are encouraging and trending in the right direction, the fact remains that the consequences of a high-speed collision on the ground are potentially catastrophic.

Demanding schedules, inadequate rest periods and insufficient or inaccurate information related to weather or airport conditions can degrade the performance of even the most seasoned and dedicated pilot. Recognizing these facts, the Federal Aviation Administration (FAA) has made efforts to address a number of these issues by emphasizing improvements to crew operating procedures and training. Clearly, the focus on human factors should continue, but the need to invest in available technological improvements, system design enhancements and procedural changes to reduce pilot and air traffic controller errors, all of which contribute to the problem of runway incursions, remains.

The pressure on the National Airspace System (NAS) is, as you know, growing daily. The aging infrastructure we rely on is in dire need of modernization. The need for a long-term modernization effort in communications, navigation, and surveillance systems is reflected in many programs with a direct impact on runway safety.

Ingenious technology, combined with political will and monetary resources, has virtually thwarted two of the deadliest types of aircraft accidents: midair collisions and controlled flight into terrain (CFIT). The traffic alert and collision avoidance system (TCAS) warns pilots of an impending collision and gives instructions on how to avoid it. Since the introduction of TCAS, many midair collisions have been averted, and numerous lives have been saved.

The invention, development, and implementation of the ground proximity warning system (GPWS), and its newer supplement, the enhanced GPWS, or EGPWS/TAWS, has had the same powerful effect on reducing the number of CFIT accidents that TCAS has had on reducing the number of midair collisions. Prior to the development of these systems, existing technologies, training, and procedures were insufficient to satisfactorily meet the challenge of preventing incidents and accidents. Following their deployment, enhanced situational awareness and conflict alerting capability were combined for a powerful one-two punch directed at the heart of the problem. However, in both instances, recommendations for effective risk mitigations were ignored until several high-profile accidents occurred.

A similar situation exists for mitigating runway incursions. According to the U.S. Commercial Aviation Safety Team (CAST), the risk posed by runway incursions can be reduced as much as 95 percent by using a combination of technologies which greatly improve the flight crew's situational awareness and provide conflict-alerting capability during ground operations. Unfortunately, however, the technologies and processes we are discussing today require more than just buying an electronic box for an airplane.

They involve long-range programmatic infrastructure projects that will not succeed without a similarly long-term national commitment for sustained funding.

We cannot afford to wait for another catastrophic event before we get serious about solving the problem of runway incursions. Aviation stakeholders must renew their commitment as an industry to field effective mitigations, whether they are low-tech solutions, such as painting runways and taxiways with enhanced markings, improving airport signage and lighting, or more sophisticated answers, such as providing electronic flight bag with moving map display and Automatic Dependent Surveillance Broadcast (ADS-B) technology on the flight deck. We need to provide the best equipment in control towers and cockpits that will improve situational awareness at both ends of the radio. More rapid and wide-spread installation of systems like runway status lights (RWSL) that have already been proven effective in reducing the risk of runway incursions at airports such as Dallas-Ft. Worth (DFW), San Diego (SAN) and Boston-Logan (BOS), will have a great effect on improving safety.

Mitigating the risk of runway incursions has proven to be a very difficult undertaking and we are undoubtedly years away from reaching what anyone would term a successful conclusion. We challenge both government and industry to mutually establish a goal of zero serious runway incursions involving commercial airliners and focus our resources and attention on that goal until it is achieved, no matter how long it takes us.

Implement CAST Recommendations

Since we testified before the Subcommittee in February, FAA and the aviation industry have worked hard to bring greater safety to the runway environment. I would like to update you on the action items that we discussed earlier this year.

ALPA's white paper on Runway Incursions, published in March 2007, proposed that the U.S. government and aviation industry fulfill the commitments that were made to implement the recommendations of the CAST Runway Incursion Joint Safety Implementation Team (R-I JSIT).

CAST determined that 95 percent of all runway incursions could be prevented by having:

(1) cockpit moving map display with own-ship position for improved situational awareness
(2) integration of ADS-B to enable pilots and controllers to see all aircraft and vehicles on the surface and aircraft up to 1,000 feet above ground level
(3) automatic runway occupancy alerting, and
(4) digital data-linked clearances that are displayed on the moving map.

Cockpit Moving Map Display with Own-Ship Position

Electronic flight bags (EFBs), which provide computer-generated displays of aircraft and flight information, can be used to display moving maps and own-ship position. Although

the FAA has announced its intention to amend its policies on the use of EFBs in order to provide airline pilots with additional safety tools, only a very few airliners have been equipped with EFBs which display moving maps and own-ship position. Installation of this vital equipment on airliners should become a national aviation safety priority.

The FAA is now working on two initiatives aimed at putting EFB's into airliners. The first is a $5 million project to test these in-cockpit displays. This funding will assist operators in equipping their aircraft with EFBs and an aural warning system. Secondly, the FAA has allocated $9.3 million to accelerate air-to-air applications, with specific emphasis on runway safety. This funding will allow the FAA to accelerate the ADS-B surface conflict detection/cockpit alerting application, and provide industry participation and perspective on the application development, which should enable manufacturers to produce production-ready avionics at a lower cost.

Automatic Dependent Surveillance – Broadcast (ADS-B)

ADS-B does not rely on a ground-based infrastructure. Three-dimensional, Global Positioning Satellite (GPS)-derived aircraft positioning reports will provide air traffic controllers with greatly enhanced air traffic surveillance capabilities. Additionally, the use of ADS-B in a surface-alerting system will enable pilots and controllers to see all aircraft and properly equipped vehicles on the airport surface and aircraft up to 1,000 feet above ground level.

A recently issued FAA Notice of Proposed Rulemaking (NPRM) would require mandatory ADS-B OUT equipage for National Airspace (NAS) operations after the year 2020. ALPA believes that this mandate should be accelerated and that it is imperative that increased emphasis be placed on the development of technology and procedures for display of traffic information on the flight deck via ADS-B IN. ADS-B OUT capability is a necessary enabler to follow-on applications and improves controller surveillance, but provides pilots with no additional situational awareness information. Operational safety enhancement will only be gained with equipage of aircraft with ADS-B IN and Cockpit Display of Traffic Information (CDTI). Once the safety and efficiency gains for this technology are analyzed, it is our expectation that there will be compelling data to suggest a mandate for ADS-B technology in an accelerated timeframe.

Automatic Runway Occupancy Alerting

RWSL's work in conjunction with an airport's surface movement radar system and provide pilots with a direct indication of runway status, a recommendation endorsed by the NTSB. In a recent operational evaluation conducted by MIT's Lincoln Laboratory at Dallas-Fort Worth International Airport (DFW), runway incursions on the test runway decreased by 70 percent. FAA announced this summer that a total of 22 airports will received RWSL's by 2011.

ALPA recommends that the RWSL system become a standard technology upgrade for all large air carrier hub airports. Airport Improvement Plan (AIP) funds should be allocated to expedite implementation for all candidate airports.

At least one major air carrier has installed an automatic runway warning system in some of its aircraft for aural alerts to the flight crew. Although the system does not alert to the presence of other aircraft, it is useful for enhancing situational awareness. Some crews have found that this particular system's automated alerts can, however, conflict with receiving ATC clearances and other radio transmissions.

FAA is currently testing the Final Approach Runway Occupancy Signal (FAROS) at Long Beach/Daugherty Field in California and at Dallas-Ft. Worth (DFW). FAROS, which was initially conceived and promoted by a former ALPA Airport Standards Committee chairman, is intended to warn flight crews on final approach that their runway is occupied. FAROS flashes visual glide slope indicator lights when it is not safe to land and may ultimately be useful in preventing land-over and other types of occupied-runway events.

Digital Data-linked Clearances

Government and industry are still developing standards for digital data-linked clearances. While the long-term goal remains to transition from voice-only to data with voice, there are still many safety hurdles to be cleared before such data can be used for anything other than advisory messages.

Improve Air Traffic Controller Training

In 2000, CAST made recommendations intended to improve air traffic controller training. Subsequently, the FAA issued guidance for the development of a Controller Resource Management (CRM) curriculum which has been incorporated into initial and recurrent controller training programs. ALPA applauds the FAA for having begun the CRM program at all ATC facilities across the US. Industry experience has proven that CRM training must be a continuing process that builds and reinforces CRM concepts.

The FAA has also installed Tower Simulation Systems (TSS's) at 22 airports in the US. As with any start-up programs, the TSS will need buy-in from line controllers and supervisors, on-going review and feedback, and close monitoring for effective results. ALPA expects that the TSS will provide more realistic depictions of an airfield and its surrounding areas as it is programmable to replicate varying traffic, weather, lighting and visibility conditions. The combination of CRM and TSS is clearly a positive step in the effort to prevent runway incursions.

Airport Design and Enhanced Airport Signage and Markings

The FAA's action to require all commercial airports to implement enhanced taxiway markings is another positive step toward assisting pilots in maintaining situational awareness on the surface. Of those airports having more than 1.5 million annual passenger enplanements, 71 have accomplished this goal, 62 other airports have voluntarily made the improvements, with 121 more airports planning to finish the task by the end of the calendar year. ALPA recommends that all FAR Part 139 airports install

enhanced taxiway markings, to include a red runway identifier marking at runway entrances.

Implementing enhanced surface markings will clearly assist pilots in identifying approaching runway intersections, but their usefulness is limited when an airport surface is obscured by snow or other forms of precipitation or contaminants. Because surface markings have limited application, a number of other technologies have been developed which are intended to improve the situational awareness of pilots traversing an airport's surface. Use of these directional aids takes on added meaning when pilots are navigating airfields with which they have little familiarity, or are operating in adverse meteorological or high traffic conditions.

The following recommendations on available technologies are contained in the CAST 2002 RI-JSIT report wherein it is noted that substantially improved ground movement navigation guidance is needed to prevent runway incursion accidents and incidents:

- Variable electronic message boards which display critical clearance related instructions such as "hold," "cross," or "takeoff."
- Provision of runway occupancy information to pilots on final approach to prevent "land over" accidents and incidents in which an arriving aircraft jeopardizes, or collides with, an aircraft positioned on a runway awaiting takeoff clearance.
- "Smart" ground movement lighting that indicates the cleared taxi route, substantially reducing runway incursions which result from pilots proceeding onto a runway or taxiway without a clearance.

End-Around and Center Taxiways

ALPA supports the installation of perimeter (i.e., end-around) taxiways as they enhance both safety and capacity by drastically reducing opportunities for runway incursions. Atlanta Hartsfield International Airport (ATL) has completed construction of an end-around taxiway that allows traffic to proceed from arrival runways to terminal gates without crossing other arrival or departure runways. Because Atlanta's airport experiences 500–600 fewer runway crossings daily due to its end-around taxiway, there are that many fewer opportunities for a runway incursion. Additionally, operational data has demonstrated that perimeter taxiways can actually increase airport efficiency. Dallas-Ft. Worth (DFW) is in the process of constructing several of these taxiways.

The history of runway incursions includes numerous cases involving parallel runways, where a landing aircraft exited the runway via a high-speed taxiway onto an occupied parallel runway causing a runway incursion in the process. This high-risk scenario can be mitigated by implementing a center taxiway between parallel runways. ALPA supports the Los Angeles World Airport authority's intent to include a center taxiway between parallel runways in their north airfield modernization program for this reason.

Airport Surface Detection Equipment Model X (ASDE-X)

ASDE-X, which operates on the principle of multi-lateration, provides tower controllers with increased situational awareness of the airport surface by displaying a wide variety of targets, including aircraft and ground vehicles. Currently, only 11 airports in the U.S. have ASDE-X installed. ALPA supports an accelerated plan to implement ASDE-X at all OEP airports. While issues remain with its operational use, we believe that this technology offers controllers a high fidelity presentation of the airport surface movement area so as to provide reliable data and better decision-making.

This summer, FAA announced that it was soliciting industry proposals to purchase and install low-cost ground surveillance systems for airports that are not scheduled to receive ASDE-3 or ASDE-X. The agency has evaluated two such systems in Spokane, Washington and intends to deploy them to six more airports in 2009.

Non-Standard Air Traffic Phraseology

We testified in February of our concerns stemming from the fact that the U.S. has not fully aligned itself with ICAO guidance for aviation phraseology used in radio transmissions. We are pleased that the FAA recently accepted the ICAO phraseology for instructing a flight to enter the runway and hold its position until a takeoff clearance can be issued. This is a step in the right direction. However, ALPA encourages the FAA to adopt taxi phraseology for airport surface operations. The ICAO guidance is more succinct than the FAA's phraseology and requires a specific affirmation of a clearance to cross all active runways on their assigned taxi route. Adoption of the ICAO phraseology would reduce the possibility of inadvertently crossing a runway without a clearance.

On any given day there are hundreds of internationally based flight crews operating at our nation's busiest airports. With multiple accents on busy radio frequencies and the lack of a common understanding as to what is expected of everyone, we fear that safety is being compromised.

Standard Operating Procedures (SOPs)

ALPA recommends improved standard operating procedures (SOPs) and improved training for aircraft ground operations throughout the aviation industry. One prudent SOP is to complete as much "heads down" activity as possible prior to departing the gate. To accomplish this goal, ALPA recommends that all airlines standardize their procedures and implement the guidance contained in FAA Advisory Circular (AC) 120-74A, *SOPs for Ground Operations*. Completing all pre-departure checklists and briefings before leaving the gate will significantly reduce crew distractions during the taxi phase. Similarly, executing post-landing checklists after safely clearing the active runway, but before initiating taxi to the gate, will ensure that both crewmembers are focused on taxi clearance instructions and the safe transiting of the prescribed route.

One major airline has noted that complex taxi routes and pilots' misunderstanding of taxi instructions account for over 90% of their runway incursions. This miscommunication is due in part to the necessity for flight crews to complete complicated checklists as they taxi. Frequently, flight crews must process changes to navigation routings given by air traffic controllers (ATC), or prepare the aircraft for flight as they determine correct aircraft trim settings based on actual weight and balance factors of the plane. Such information is often known only minutes before leaving the gate.

We know of at least two airlines that have changed their taxi procedures to facilitate the completion of all checklists items that can be accomplished prior to departing the gate area. Particularly in the event of a short taxi route, this practice will prevent crews from rushing completion of their checklist items while navigating their aircraft on the airport surface.

Runway Excursions

Rejected takeoffs and less-than-optimum landings continue to be high-risk maneuvers that may lead to a runway excursion. Ground operations in adverse weather with degraded runway and taxiway conditions play a significant part in runway and taxiway excursions. In fact, the industry continues to experience several runway excursions annually in spite of continued research and industry attention.

In response to continued runway excursions on other-than-dry runways, and precipitated by the fatal runway excursion that occurred in 2005 in Chicago, the FAA formed the Takeoff / Landing Performance Assessment Aviation Rulemaking Committee (TALPA ARC). The TALPA ARC is intended to provide a forum for the U.S. aviation community to discuss the recommended actions identified in Safety Alert for Operators (SAFO) #06012 issued in August of 2006. The goal of the TALPA ARC is to provide advice and recommendations on the following aspects of contaminated runway operations: airplane certification and operational requirements – including training – for takeoff and landing operations on contaminated runways; landing distance assessment requirements, including minimum landing distance safety margins, to be performed at the time of arrival; and standards for runway surface condition reporting and minimum surface conditions for continued operations.

While ALPA is actively involved in the TALPA ARC and initial deliverables are due to the FAA in the 3rd quarter of 2008, until the ARC completes its work, there are still some deficiencies in the guidance material provided to flight crews and airport operators for operating under adverse meteorological conditions. For instance, aircraft flight manuals do not contain actual flight-test-determined data for takeoff or landing performance under wet or slippery runway conditions. Flight crews are also not provided the necessary data to determine the effect of a contaminated runway on aircraft braking, and stopping information is vague and subjective.

Pilot braking action reports are highly subjective and based upon the crew's previous experience and operating environment. The FAA and industry must work to provide

standardized guidance to flight crews on the criteria to be used in determining pilot braking action reports. The goal is to make any pilot braking action report useful to any pilot operating to the same runway.

In the event that an aircraft is unable to stop before reaching the end of the runway due to mechanical, weather, or other operational problems, a runway safety area (RSA) is intended to ensure that an incident does not become an accident. ICAO recommends that runways have a defined RSA that is free of obstacles and extends well past the end of the actual runway. In the U.S., FAA Advisory Circular 150/5300-13, *Airport Design*, provides the criteria for an acceptable RSA.

Unfortunately, hundreds of airports in the U.S. that serve both domestic and international air carrier operations do not meet U.S. or international standards in this regard. According to recent FAA statistics, 45% or 460 of the 1,024 certificated airport runway ends in the U.S. must be improved.

Three solution methodologies exist for those airports that do not meet current RSA standards:

1. Airport authorities may remove obstacles, fill ravines, or level ground to create adequate RSAs. This option may not be possible for airports in confined geographic areas.
2. If the physical space does not exist to create the recommended runway safety area, an Engineered Materials Arresting System (EMAS) could be installed. This system uses aerated, frangible concrete to bring an aircraft to a quick but controlled stop, much like runaway truck ramps on steep mountain highways. EMAS is a solution that has proven successful in actual operation. It is generally unaffected by snow and/or ice contamination and functions to the same level of arresting ability regardless of meteorological conditions.
3. Airports can decrease the effective runway length to create adequate runway safety areas. This option may not be attractive because it could potentially result in reducing the size and weight of aircraft that use the airport.

Runway Confusion

The Comair Airlines accident in Lexington, Kentucky in 2006 and the Singapore Airlines 747-400 takeoff accident in Taiwan in 2000 represent the real risks of runway confusion. Other runway confusion-related incidents have occurred, but in those cases, safety was not compromised to the point of causing an accident.

Known causes of runway confusion usually include one or more of the following factors: degraded/inadequate situational awareness; crew in “heads down” operations; lack of advisory information on airfield configuration changes; obscuration of markings and signs; insufficient charting while construction is in progress; and, poor quality automated terminal information service (ATIS) broadcasts.

Unfortunately, this hazardous safety issue has not yet generated sufficient interest within the industry. It is clearly being handled as a "one-off" phenomena caused by a single flight crew. In our opinion, however, one event such as either the Lexington or Taiwan event is too many.

In April 2007, the CAST issued an interim report on its review of wrong-runway events. The study looked at wrong-runway events covering 25 years of accident and incident data and identified over 600 events during that period. Mitigating factors identified in the study include: the need for better inter- and intra-cockpit communications between the flight crew and between the cockpit and the air traffic control facility; airports must develop threat-and-error management techniques to assess and address hazards before they become an issue; the incorporation of devices such as runway alerting awareness system, electronic flight bag and aircraft moving map display technologies to provide improved airport situational awareness to the flight crew. While these technologies offer great potential in terms of runway and airport safety, some are expensive and may be economically burdensome to smaller airlines. One additional area of needed improvement is an enhanced Notice to Airmen (NOTAM) system which would provide timelier airport construction information to flight crews.

Summary of Recommendations

We urge Congress to assist the industry in its efforts to mitigate the risks of runway incursions, runway excursions, and runway confusion. Congress can greatly facilitate this undertaking by helping to ensure that funding is available for a long-term modernization effort in those communications, navigation, and surveillance systems which directly impact runway safety.

Following are our other recommendations.

Runway Incursions

- Provide improved ground movement training for air traffic controllers, particularly with the use of high-fidelity visual tower simulators, which are similar in quality to aircraft flight simulators routinely used for pilot training.
- Require that all airports with commercial air carrier operations implement enhanced taxiway markings including the red runway identifier marking that is not yet part of FAA's required improvements.
- Support the expenditure of funds to install perimeter taxiways, which enhance both safety and capacity.
- Airlines should work with equipment manufacturers to install Electronic Flight Bags (EFBs) with Aircraft Moving Map Displays in our cockpits. The FAA has lowered the certification requirements for them thereby reducing the cost to implement EFBs.
- FAA is scheduled to implement ASDE-X at 7 airports in 2008. Surface movement radar should be provided at all commercial airports.

- Include Runway Status Lights (RWSLs) as a standard technological upgrade for large hub airports and support Airport Improvement Plan (AIP) funding to quickly implement RWSLs at the nation's busiest airports.
- Aircraft must be adequately equipped, and regulators must develop and implement procedures, for ADS-B technology. The government and industry should push for the development of air-to-air ADS-B applications that benefit the users.
- All airlines should standardize their procedures and implement the guidance contained in the FAA Advisory Circular (AC) 120-74A, SOPs for Ground Operations.
- Change procedures to require crews to complete all pre-departure checklists and briefings before leaving the gate to significantly reduce distractions to the crew during the taxi process.
- In the short term, change procedures to require crews to complete after-landing checklists and briefings before taxiing. Longer term, airport layouts should be improved to eliminate the potential for pilots to face a runway incursion hazard when clearing a runway.
- Airlines should conduct thorough root cause analysis of all runway incursion events that involve their flight crews to ensure a complete understanding of why the event took place and implement strategies to eliminate them.

Runway Excursions

- Manufacturers must be required to provide flight crew with performance data for takeoff and landing for all runway conditions expected in service. Pilots should be provided data in the form of required landing distances, rather than in terms of weight limits. Pilot landing assessments at the time of arrival must give the flight crew the best tools available (e.g. stopping performance data using standard operational techniques, runway friction readings, pilot braking action reports, etc.) to accurately determine whether they can safely land and stop their aircraft on the runway available.
- The industry must develop a standardized set of guidelines that will allow flight crews to accurately assess their aircraft's performance and provide uniform pilot braking action reports that are compatible across the fleets being operated into that airport.
- Runways with RSA's less than 1,000 feet in length should be improved to provide at least this degree of protection. If the physical space does not exist to create the recommended RSA, an Engineered Materials Arresting System (EMAS) should be installed.

Runway Confusion

- All airlines should standardize their procedures and implement the guidance contained in the FAA Advisory Circular (AC) 120-74A, SOPs for Ground Operations.

- Change procedures to require crews to complete all pre-departure checklists and briefings before leaving the gate. The intent is to significantly reduce distractions to the crew during the taxi process.
- Provide improved ground movement training for air traffic controllers, particularly with the use of high-fidelity visual tower simulators, which are similar in quality to aircraft flight simulators routinely used for pilot training.
- Require that all airports with commercial air carrier operations have the enhanced taxiway markings including the red runway identifier marking that is not part of FAA's required improvements.
- Airports must develop some sort of threat-and-error management tool to better identify potential airport issues and enumerate those issues to the operators and flight crews in a timely manner.
- Airlines should install Electronic Flight Bags (EFBs) with Aircraft Moving Map Displays (AMMD) in cockpits.
- Improve the Notice to Airmen (NOTAM) system to provide more timely and accurate information to the aircraft as it relates to runway construction and its impact on taxi routings and runway configurations.

Thank you for the opportunity to testify today. I would be pleased to address any questions that you may have.

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