INTERNATIONAL CIVIL AVIATION ORGANIZATION

THE SECOND MEETING OF THE APANPIRG AERODROMES OPERATIONS AND PLANNING – WORKING GROUP (AOP/WG/2)

Yogyakarta, Indonesia, 3 – 5 June 2014

Agenda Item 4: Provision of AOP in the Asia/Pacific Region

AERODROME SAFETY AND CERTIFICATION PROGRAMS UPDATE

(Presented by the United States of America)

SUMMARY

Airports throughout the world routinely face a number of safety challenges. Improvements in procedures, programs and the introduction of new technology can help to improve safety. The initiatives discussed here have helped the FAA maintain its commitment to safety. The programs and initiatives offered here include runway safety, mitigation of wildlife hazards, research and development, pavement management programs, Aircraft Rescue Firefighting (ARFF), implementation of Safety Management Systems, and Airport-to-Airport Mutual Aid programs. This paper relates to –

Strategic Objectives:

*A: **Safety –** Enhance global civil aviation safety*

1. INTRODUCTION

1.1 The FAA regards safety as its number one priority and recognizes that there are many safety challenges faced by airport operators. To assist in addressing these challenges, the FAA is pursuing a number of programs and research activities to improve airport safety.

2. DISCUSSION

2.1 *Runway Safety Initiatives*: Runway Safety continues to be an important emphasis of the FAA. Although Vehicle Pedestrian Deviations (VPDs) were up from Fiscal Year (FY) 2012 to FY2013, the number of the most serious (Category A) runway incursions dropped in FY2013. Overall, in the two most serious categories (Category A and B) there were 10 runway incursions in 2013. The FAA has developed the Runway Safety Action Team Toolkit (RSAT). The RSAT toolkit was designed to assist regional and local runway safety teams in standardizing their efforts, and to provide them with the necessary tools and templates to make their work more efficient and effective. The RSAT toolkit is available at http://www.faa.gov/airports/runway_safety/resources/lrsat /.

2.2 *Addressing Wildlife Hazards*: The risk of wildlife strikes is increasing. Many populations of birds commonly involved in strikes are growing at the same time that the rates of worldwide air traffic and passenger enplanements are increasing. The U.S. continues to report increases in bird strikes. The FAA The FAA assists airport authorities by providing grant funding to help pay for Wildlife Hazard Assessments (WHA) and Wildlife Hazard Management Plans (WHMP). The FAA provides Advisory Circulars that describe the methodology for conducting a WHA and developing a WHMP.

Conducting a WHA is essential for an airport authority to know the wildlife situation on and around the airport. It is consistent with the tenets of Safety Management Systems (SMS), which require airport authorities to be proactive, to identify risks to airport safety, and to mitigate those risks to acceptable levels. The assessment, which is required to be conducted by a qualified airport wildlife biologist, is the basis for the development of a WHMP. The WHMP documents the procedures the airport authority will implement to control wildlife, at or near the airport.

The FAA sponsored Airport Cooperative Research Program has produced research studies in wildlife mitigation including: ACRP Synthesis Report Number 23: *Bird Harassment, Repellent, and Deterrent Techniques for Use on and Near Airport,* ACRP Synthesis Report Number 32: *Guidebook for Addressing Aircraft/Wildlife Hazards at General Aviation Airports,* and ACRP Synthesis Report Number 39: *Airport Wildlife Population Management*. Links to these reports can be found at: http://www.faa.gov/airports/airport_safety/wildlife/resources/.

2.3 *Industry-Government Wildlife Collaboration Initiative*: Civil Aviation Authorities (CAAs) and industry must work together to address hazardous wildlife issues in a regional, cooperative, and prioritized manner. The Industry-Government Wildlife Collaboration Initiative is such an effort between the FAA, the United States Department of Agriculture (USDA), the International Air Transport Association (IATA), the Latin American and Caribbean Air Transport Association (ALTA), their partner air carriers, and the Airports Council International (ACI). These organizations have teamed up to work collaboratively with airports authorities, CAAs and ICAO to address hazardous wildlife issues in the Caribbean and Pan-American Regions.

The partners developed a steering committee made up of members from each of the team's organizations. The steering committee worked with regional air carriers and regional airports authorities to identify priority locations for initial participation in specific pilot projects. Panama and Ecuador were selected as locations for the pilot projects. The first assessment (initial pilot project) began the week of June 25th, 2012 in Panama and the final site visit took place July 2013. The steering committee has been working with the ICAO Regional Aviation Safety Group-Pan-America (RASG-PA) Executive Steering Committee, and the Regional Wildlife Group (CARSAMPAF) throughout the program to gather additional data and recommend mitigation actions. The Committee met in Mexico City in January, where they agreed to the essential characteristics of the program and future steps to move it forward.

2.4 *Engineered Materials Arresting Systems*: The development and use of Engineered Materials Arresting Systems (EMAS) to arrest aircraft in the event of an aircraft overrun has been a huge success in the United States. EMAS has been deployed at 74 runway ends at 46 airfield locations throughout the United States, and has successfully stopped 9 overrunning aircraft. The latest successful aircraft overrun arrest in the United States happened at Palm Beach Airport in October 2013 when a Cessna Citation was successfully arrested.

EMAS uses crushable material placed at the end of a runway to stop an aircraft that overruns the runway. The tires of the aircraft sink into the lightweight material, and are decelerated as it rolls through. EMAS beds are specifically designed at various strengths to arrest aircraft within the fleet mix of the airport it is installed at. An EMAS comparable to a standard overrun runway safety area must have a minimum stopping capability for the design aircraft of 70 knots (standard EMAS). Otherwise a non-standard EMAS can be installed if it has a minimum stopping capability of 40 knots for the design aircraft. Additionally, the runway threshold should be located far enough from the back of the bed to allow for standard undershoot requirements. The following information involves requirements for EMAS:

- An EMAS includes a bed and a setback distance that requires the closest point of the bed to be a minimum of 35 feet from the end of the runway, although 75 feet is preferable.
- An EMAS is constructed on a paved base.
- An EMAS must be, at a minimum, the width of the associated runway plus any sloped area.
- An EMAS must be designed for safe ingress and egress and allow for movement of emergency response vehicles during a rescue operation.
- An EMAS must be constructed to accommodate navigational aid structures within its boundaries, if necessary.
- An EMAS must be designed to prevent water from accumulating on the surface or from infiltrating into the core material.

For more information on EMAS, please reference Advisory Circular (AC) 150/5220-22B, Engineered Materials Arresting Systems (EMAS) for Aircraft Overrun at: http://www.faa.gov/documentLibrary/media/Advisory_Circular/150_5220_22b.pdf

2.5 *Runway Safety Area Improvements*: The FAA continues to make progress improving Runway Safety Areas (RSAs). These areas enhance safety in the event an aircraft undershoots, overshoots, or veers off of the side of a runway. As of the end of FY 2013, a total of 578 RSAs have been improved since 2000. A total of 25 RSAs are scheduled for improvement in 2014. The FAA expects to make all practicable RSA improvements at commercial service airports by the end of 2015.

2.6 *Safety Management Systems*: The FAA is working to implement SMS at aerodromes in the United States. To provide initial SMS guidance to airport authorities, the FAA published Advisory Circular 5200-37, *Introduction to Safety Management Systems at Airports*. Following the publication of AC150/5200-37 several SMS pilot studies were undertaken to gain experience with SMS and provide information that will help the FAA develop an amendment to our aerodrome certification regulation to require aerodromes to implement SMS. Rulemaking in the United States is a lengthy process. We plan to issue a Supplemental Notice of Proposed Rulemaking in 2014 and a final rule in winter of 2016.

2.7 *Airport Foreign Object Debris (FOD) Programs*: The presence of foreign objects in the airport environment introduces a hazard to aircraft safety. FOD is any substance, debris, or article alien to the vehicle or system that could potentially cause damage. The FAA has chosen Boston Logan and Miami International airports as sites in which further data will be collected and analyzed under operational conditions. Preliminary indications are that the automated system at Boston is fully functional and performing well, already detecting objects such as dislodged in-pavement centerline lights to birds on the runway surface at night. Miami and Seattle are procuring FOD systems for one runway.

2.8 *Aircraft Fire Research*: The FAA has completed over a year's worth of full-scale live fire testing involving a retired Airbus A-310 cargo aircraft. Research reports from this program were recently published detailing the findings in areas of firefighting strategies and tactics, development of a prototype firefighting nozzle, weight and balance behavior of freighter aircraft and aircraft skin-penetrating nozzle testing of cargo liner materials.

Also, the FAA, in conjunction with ICAO is working to revise Chapter 6 (Heliport Services) of Annex II, to address fire-fighting procedures for elevated heliports. A meeting was held in France by the Heliport Design Working Group in May 2014, to discuss this topic among many others. Additionally, the U.S. National Fire Protection Association (NFPA) provides a standard for heliports in Document 418.

2.9 *U. S. National Airport Pavement Test Facility*: The FAA continues to conduct pavement research at the U. S. National Airport Pavement Test Facility at the William J. Hughes Technical Center in Atlantic City, New Jersey. The facility includes:

- A 900-foot-long by 60-foot-wide in-door test pavement;
- Embedded pavement instrumentation and a dynamic data acquisition system;
- Environmental instrumentation and a static data acquisition system (4 samples per hour);
- A test vehicle for loading the pavement with up to 20 aircraft tires at wheel loads of up to 75,000 pounds;
- The test vehicle is capable of simulating aircraft weighing up to 1.3 million pounds.

2.10 *Airport Pavement Management System*: FAA PAVEAIR, released in 2011, is a web-based airport pavement management system that provides users with historic and current information about airport pavement construction, maintenance, and management. PAVEAIR 2.0 was released June of 2012. We developed it for installation and use on a stand-alone personal computer, an intranet, and the internet. An implementation of the internet version of FAA PAVEAIR is made available by the William J. Hughes Technical Center on the FAA PAVEAIR web site at http://faapaveair.faa.gov.

2.11 *Airport Cooperative Research Program (ACRP):* The FAA also sponsors a unique cooperative research program, providing US$15 million per year to fund ACRP research studies. Typical studies are funded at between $300,000 and $500,000 and take one to two years to complete. TRB forms a volunteer technical panel of experts to turn the topic into a request for proposal to solicit contractors wanting to do the research. The ACRP also conducts Webinars. The list of scheduled Webinars is available at the ACRP website.

2.12 *Emergency Response Planning:* ACRP Report 73, *Airport-to-Airport Mutual Aid Programs*, explored the Disaster Operations Group (DOG) concept and how it might be used by airports to develop an emergency assistance program between airports. ACRP Report 45, *Airport-to-Airport Mutual Aid Agreements*, offered guidance on model mutual aid agreements. ACRP Report 95, *Integrating Community (A-CERT) Response Teams at Airports*, provided guidance and tools to help organize and operate a citizen volunteer program to assist airport staff in emergency events or disasters.

2.13 *Avian Radar:* The FAA Airport Technology Research and Development Branch, located at the William J. Hughes Technical Center in Atlantic City International Airport, New Jersey, launched an effort in 1999 to identify sensors that could detect and track birds in the critical airspace of airports (below 3000 feet above ground level for distances out to 6 nautical miles). Before this effort, many radar types had been used successfully for bird research, including the NEXRAD, modified military radars, and marine band radars with advanced digital processing. The FAA focused its research on using radar to increase airport safety from a wildlife hazard mitigation perspective. Bird radars were not a new technology, but their application at civil airports was new.

Through a grant to the University Of Illinois Center Of Excellence for Airport Technology (CEAT), a multiyear program was established to assess new safety technologies for commercial airports. In 2001, the FAA joined forces with radar experts in the U.S. Air Force's (USAF) Air Force Research Laboratory in a Dual Use Science and Technology Program to develop an avian radar system. In 2002, WaveBand Corporation was selected through a competitive process to develop a 94-GHz radar for this program. CEAT assessed the WaveBand radar throughout its development and in field tests in 2004 and 2005 at the Dallas/Fort Worth International Airport (DFW) and the Fermi National Accelerator Laboratory in Illinois. CEAT determined that the radar could effectively detect and track birds.

At the same time, other private companies were advancing radar technology for bird detection. As bird radars became commercially available, the FAA shifted its focus from developing bird radars to assessing the performance of existing bird radars and their potential use at civil airports.

Three radar systems are being studied (Accipiter Radars, DeTect MERLIN Radars and SRC BSTAR Radars). Issues of deployment still remain, such as siting and installing radars in the complex operational environment of civil airports. The FAA is working closely with New York John F. Kennedy International Airport (JFK), Chicago O'Hare International Airport (ORD), Dallas - Fort Worth International Airport (DFW) and Seattle – Tacoma International Airport (SEA) to determine the best ways to use bird radars in daily operations.

The first Advisory Circular was published in November, 2010. The FAA continues to study the BSTAR Radars at DFW with the introduction of second radar at the airport to observe the ability to better understand how two or more radars can offer expanded coverage at a large airport. The covered portions of the sky have been determined with this type of radar, along with nearby NEXRAD radars, and this has enabled the FAA to develop methods for tracking migrations on a regional and local scale.

A formal agreement has been established between the FAA Office of Airports and the FAA NextGen Organization to help explore the feasibility of integrating bird radar information into the Air Traffic Control environment. The two organizations are in the second phase of work in which they are examining concepts of operation. The program is referred to as the Wildlife Surveillance Concept (WiSC).

As the FAA continues to study these technologies, there is rapid movement to address market potential. There are often new challenges identified along the way that were not clearly evident early on. The FAA is engaged in one such challenge right now with respect to frequency authorizations for operating these systems at airports. So the FAA will be looking into the different systems from a spectrum's perspective in hopes of developing spectrum process guidance for airports that may pursue using federal grants to acquire bird radars.

3 CONCLUSION

3.1 There are many safety challenges faced by airports throughout the world. There are also many creative solutions to address those challenges.

4 ACTION BY THE MEETING

4.1 The meeting is invited to:

a) Note the contents and conclusions of this paper.

b) Consider adoption or implementation of the technologies and/or processes discussed to address the on-going safety challenges faced by airports.