Enhanced Bird Threat Information in the ATCT: 
WiSC Research Update

Presented to: Bird Strike Conference 2018
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Overview

• Background
  – Defining the Wildlife Surveillance Concept (WiSC)
  – Research Activities Review

• Current Research Activities
  – ATC Benefits Whitepaper
  – Pilot Engagement Panel (Florida Institute of Technology)

• Next Steps
Background
WiSC Overview

Wildlife Surveillance Concept (WiSC)

• A concept that enables the introduction of more precise bird threat information to the ATCT environment
  – Commercially available radar systems identified in AC 150/5220-25

Objectives

• Increase safety by reducing the probability of damaging strikes
  – Improve bird threat detection
  – Improve bird threat information quality passed to the aircraft
  – Improve ATC procedures for disseminating avian threat information
Bird Threats - Today

- Visual Observation
  - Pilot
  - Tower Personnel
  - Airport Ops
  - Wildlife Biologist

- Verbal Communication

Today
- Communicate Advisory
- Monitor Time
- Query Aircraft
WiSC Overview

Information Needs

- Bird threat characteristics
- e.g., altitude, speed, mass, etc.
WiSC Research

- Literature Review Database
- SME Panel
- Site Visits  Phase 1

- Technical Interchange Meeting
- Shortfall Analysis
- Laboratory HITL Demonstration  Phase 2

- FAA Concept Review
- Concept Socialization
- Site Validation Activity  Phase 3

- Benefits Whitepaper
- Information Needs Whitepaper
- Final Concept of Operations  Phase 4
Subject Matter Expert Panel

• Controllers, Supervisors, & Airline Pilots
  – Scenario walkthroughs (5)
  – Reviewed notional interfaces (graphical, textual)
  – Rated avian threats, value of supplemental bird threat information

• Key focus areas were identified
  – System accuracy, ATC system options, Information Display and Interface Design Options, Procedural and Workload Considerations

Scenarios

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Final Report

Notional Displays

Feb 2014
Site Visits

- Interviewed airport ops. personnel, supervisors, & controllers
- ATC & mgmt. responded favorably to the concept and noted the need/utility for more precise information
Human-in-the-Loop Lab Demo

Tower Simulator (Human Factors Laboratory)

• 270-degree OTW virtual ATCT

• 5 controllers from facilities with known bird strike issues

• Researched novel methods of displaying bird threat information to controllers

• Examined measures of preference, workload, situation awareness, and communications

• FAA technical report published October 2016
Activities & Updates

Benefits Whitepaper
WiSC Benefits Whitepaper

- Whitepaper focused on the controller benefits of adding more precise bird threat information to ATC

- Delivered final paper to FAA, ANG-E61 in July 2018

- Document link:

  https://www.dropbox.com/s/pbyjsyasvycuuhz/WiSC%20Benefits%20Whitepaper%20Final.docx?dl=0
WiSC Benefits Whitepaper

- **Benefits Pool**
  - Avian radar benefits divided into 4 areas
  - WiSC is a portion of potential avian radar benefits pool
WiSC ATC Benefits

• Improved threat detection
  – Bird threat information is obtained by the controller sooner allowing them to be proactive as opposed to reactive
  – Eliminates the reliance on visual observation/confirmation of birds
  – Allows bird detection during low visibility/night operations
  – Reduces cognitive demand
WiSC ATC Benefits

• Improved information quality
  – More precise position and altitude information
  – More accurate size (biomass) and direction of flight information
  – Controllers communicate with only the affected aircraft
Which runway is impacted?
WiSC ATC Benefits

- **Improved procedures**
  - Display only significant avian threats to controller
  - Relieve 15 minute reporting period when possible
  - May reduce bird-related communications over the frequency
  - Reduced workload related to bird threat management

![Not Significant](image1.png)

![Significant Threat](image2.png)
What is the significance of 15 minutes?

Gull
5.5 miles (22 mph)

Duck
11.25 miles (45 mph)

8000’ Runway
Avian Radar Benefits

- **Wildlife Management & Airport Operations Benefits**
  - Improved Wildlife Hazard Analysis (WHA) & Wildlife Hazard Mitigation Plan (WHMP)
  - Improved understanding of wildlife trends (daily, monthly, seasonal, etc.)
  - Near real time bird threat information for active mitigation of threats on airport
  - Improved understanding of attractants and areas to be remediated
Potential Operational Benefits

• Analysts applied industry-standard values (damage, injuries, delays, etc.) to project a monetized shortfall related to the inability to identify birds and mitigate strikes.

• Leveraged data from FAA Wildlife strike database

• Based on 20 year lifecycle

• Average annual costs $337M*  
  – This is likely a conservative estimate
Activities & Updates

Pilot Engagement Panel
Pilot Engagement Panel (PEP)

- Florida Institute of Technology (FIT) Aviation
  - Developed & convened a pilot Subject Matter Expert (SME) Panel
  - Conducted in Melbourne, FL on 7/24/18 & 7/25/18
  - 10 pilots participated
    - Commercial, general aviation, and military domains
    - 1 participant was currently employed in airport operations
  - Validated scenarios, identified benefits, and provided guidance on operational implementation
  - Participants responded favorably to WiSC
Pilot Engagement Panel (PEP)

- Preliminary Findings
  - Bird threat advisories needs to be as specific as possible to provide actionable information to pilots
    - Threat magnitude (biomass, number of birds)
    - Altitude
    - Position (distance from aircraft)
  - Pilots need bird information prior to being on stabilized approach (arrival) or before 80 knots (departure)
  - Standardized threat levels so pilots can understand the potential effect on their aircraft
    - 3-5 levels of bird threat suggested
Next Steps

Current Scope of Work

• **White Paper**: Information Needs and Interface Requirements

• **Concept of Operations**: WiSC ConOps (Version 3.0)

• **Site Validation Activity**: Summary of findings

• **Initiate Concept Transfer**: briefing operations and air traffic organizations on maturity and project status

• **Concept socialization**: Bird strike presentation, technical publication, etc.
Questions?

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