



**AVIATION WEEK EXECUTIVE ROUNDTABLE:
*Defining Real-Time Information Flow for Birdstrike/FOD Detection***

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October 27, 2009*

A key component in improving aviation safety is preventing birdstrikes and foreign object debris (FOD) related accidents. In addition to basic safety issues, the incidence of birdstrike/FOD results in air traffic disruptions. Combined these two issues – safety and disruption – impact the overall operation and cost in time and dollars.

Recent advancements in radar and sensory technologies allow an immense amount of raw data on wildlife/bird movements and FOD detection around airport environments.

With air traffic controllers, airports, pilots, and airlines involved in a safe and successful departure/arrival of the aircraft, there needs to be finely-orchestrated communications between all stakeholders to assure prompt, consistent, and concise exchange of appropriate information, data and action.

The Birdstrike Roundtable is among roundtables held throughout the country on areas of significant concern and interest to a broad range of aerospace and defense organizations. AVIATION WEEK began holding roundtables in 2004 to bring together multiple stakeholders in a neutral environment to address issues critical to the aerospace and defense community, with the goal of identifying actions to be taken by individuals or organizations that will benefit the enterprise as a whole.

A standardized process communication flow for detecting and alerting wildlife/FOD risk was the focus of an Oct. 27 AVIATION WEEK Executive Roundtable held at the National Press Club in Washington, D.C. The goal of the roundtable was to define information processes and tools from data gathered by bird or foreign object debris (FOD) detection systems to improve overall safety at commercial airports in the next 12-18 months. The event followed AVIATION WEEK'S Management Forum on Birdstrike Prevention May 5-6, 2009.

The roundtable was hosted by Timothy Logan, Senior Director of Operational Safety, Southwest Airlines, and Fran Fiorino, Senior Safety and Training Editor, AVIATION WEEK. The meeting was sponsored by DeTect Inc.

Organizations participating in the roundtable were Air Line Pilots Association; Air National Guard; Air Transport Association; Airports Council International; Akerman Senterfitt; Albert Froneman Consulting; American Airlines; American Association of Airport Executives; American Eagle; BAE Systems; Continental Airlines, Inc.; DeTect, Inc.; EMTEQ, Inc.; Raytheon Co.; Salt Lake City Int'l Airport; SITA; Southwest Airlines; Thales ATM, Inc.; and US Airways.

Roundtable participants divided into four work groups that were challenged to respond to a set of questions that focused on either the standardization of process and tools surrounding bird radars and FOD detection systems, or communication and training in the adoption and integration of these processes. Following the discussion, participants prioritized industry actions.

KEY FINDINGS:

- A real-time alerting system must be defined that includes some predictive capabilities and must be able to assess the magnitude of threat with specificity.
- Standardization is needed to define and classify hazards and their threat levels. This information needs to be provided real-time from air traffic control (ATC) to pilots to assure prompt and appropriate response action is taken.
- To assure ease of transition to such a process, participants recommended following the same model/matrix developed to communicate between tower and aircraft concerning windshear.
- There will be human factor considerations for pilots, ATC, and ground operations – transition to new processes and tools must consider all three of these groups.
- Bird radars/FOD systems must detect, but also report, assess risk, analyze and archive data.
- Cost and funding for hardware, implementation, training, and operations is a major concern and barrier to implementation; a business case must assess cost in terms of aircraft repair, but also in terms of disruption, with reduction in overall operational risk as the goal.

EXECUTIVE SUMMARY – The Birdstrike/FOD Roundtable on October 27 confirmed the urgent need for a defined process of information and operations between the ground and the air. Data must not only be standardized, but analyzed with predictive capabilities and risk assessment.

The key findings are based on the details of topical conversations in the work groups, which addressed the following sets of questions:

1. Standardization of Process and Tools

What elements require standardization? What should the flow of operations with regard to tools look like? What type of timeline should be used to assure this concept of operations matures and is put into place? What are the barriers to standardizing? What are the enablers? Where does this fit within overall air safety strategies?

2. Communication and Training

What are the primary information sources/requirements that are required? How should the information/data flow from a visual stance? How should the information/data flow verbally? What are the key response processes/actions required based on the information? What are the obstacles to adoption?

WORK GROUP FINDINGS:

STANDARDIZATION OF PROCESS AND TOOLS

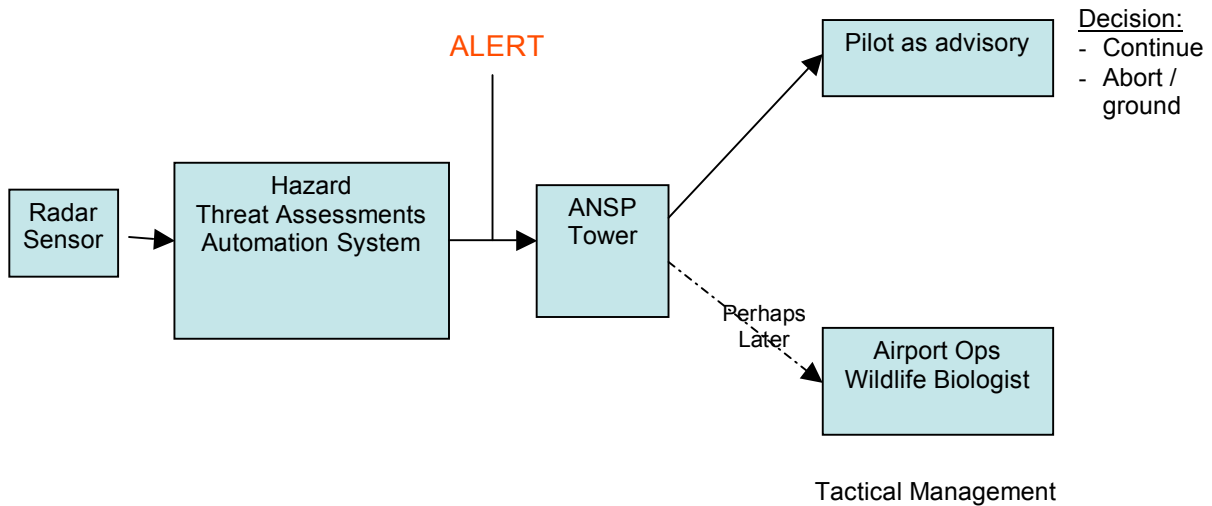
- **Elements that require standardization:** Hazards need to be consistently defined and classified
 - Quantify size and concentration (specific level of threat)

- Identify stationary versus mobile (grounded vs. falling debris; stationary vs moving wildlife)
- Historical data should be used to identify and forecast patterns
- Data and patterns should be used to provide modeling to determine magnitude of risk

Ideal Flow of Operation:

- Use the existing windshear detection/communication model as a foundation for birdstrike prevention system
- Use the existing Runway Condition Monitoring detection/communication model for FOD prevention system
- Develop an operational matrix that would serve as base for decision-making
 - Aircraft type
 - Threat
 - Magnitude
 - Recommended action
- Need to identify who “owns” the recommendation – ground ops, ATC, airline/pilot

Possible Model NEARCAST – TACTICAL



Timeline:

- There is a sense of urgency to identify remedy for process
- Within 18 months, pilot installations at high-risk airports to test operational flow, analyze archived data, and establish operating methodology.

Obstacles to standardization:

- Civil aviation
- No determination on who “owns” decision
- Prescriptive guidance is key to acceptance
- Additional work load for stakeholders
- Comfort with technological solution
- Predictive modeling technology not currently in place
- Liability stemming from data
- Cost to implement
- Perceived need versus other air transport/safety strategies

Enablers to standardization:

- Public awareness currently is high
- Technology available
- Cost savings and avoidance is a reality (need to gather and develop business case)
- Little/no environmental impact

COMMUNICATION & TRAINING

Primary Information Sources/Requirements

- Current situation includes visual and technological information
 - Visual – pilot reports, tower, camera systems, operations, tracking
 - Sensors – radar, camera systems

Information/Data Flow from a Visual Stance

Temporal

Info

Participant

Strategic

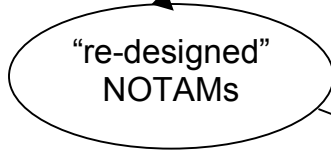
Behavioral Models & Habitat ← Wildlife Biologist



→ Dispatchers
→ Flight Crews

Seasonal

Monitor Patterns/ Activity ← Wildlife Biologist



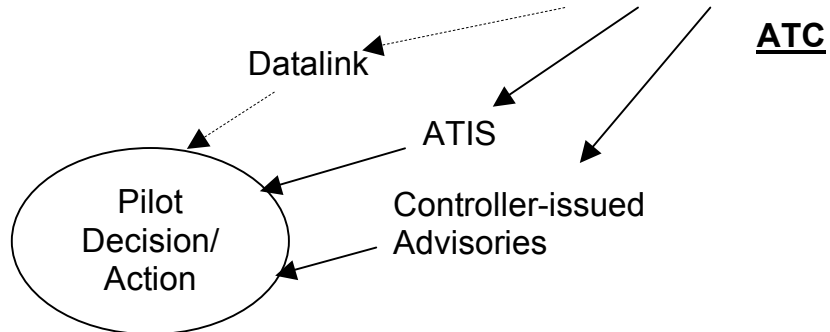
← { Observational:
Airport staff
Pilots
ATC

→ Dispatchers
→ Flight Crews

Real - Time

Visual Observations ← { Airport staff
Pilots
ATC

Electronic Observations → Info Consolidation

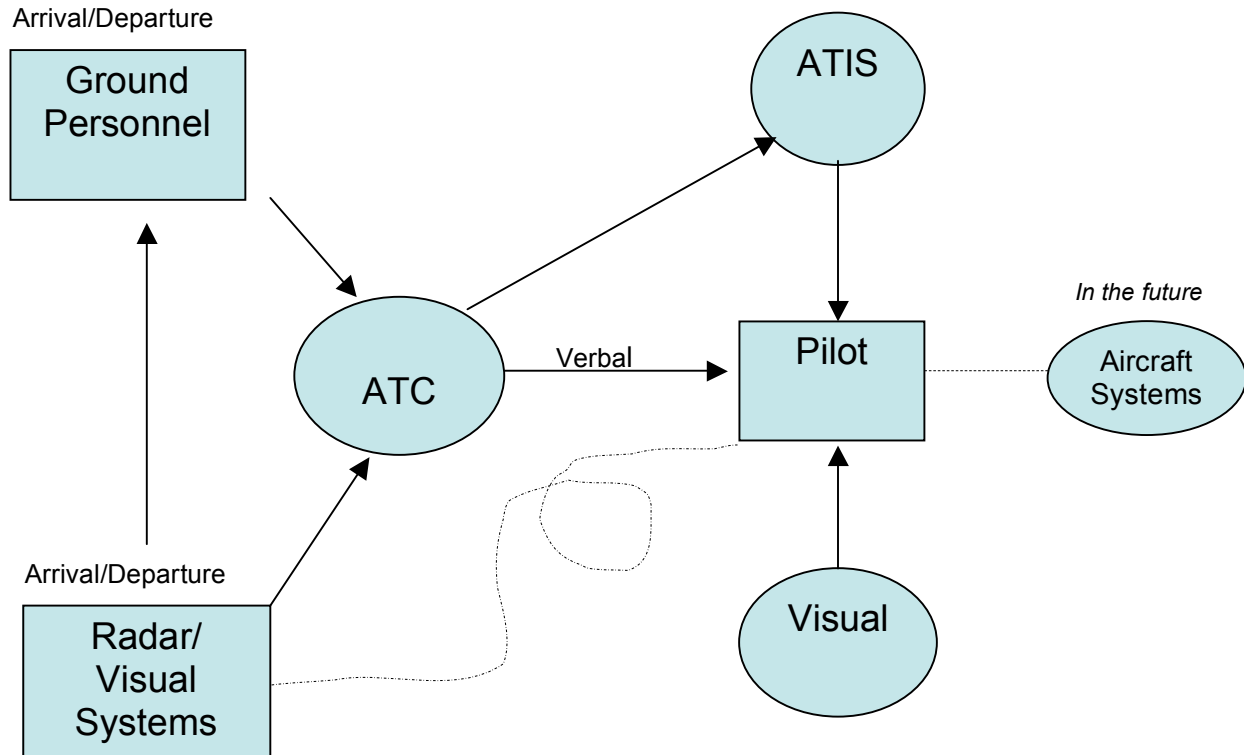


Datalink

ATIS

Controller-issued
Advisories

ATC



Verbal Information/Data Flow

<u>Tower:</u>	<u>Pilot:</u>	<u>Where:</u>
Normal	Light	Distance
Special	Moderate	Altitude
	Severe	Time
		Type

Other Considerations:

- Airport environments differ significantly and this depends on the environment
- The real-time concept requires integration of visual and electronic inputs
- False alarms not acceptable – will affect adoption and will contribute rather than resolve disruption/cost
- More screens divert human eyes away from visual assessment (need for concise, automated interfaces)

Key Response Processes/Actions required (based on information)

Tactical:

- Upon visual observation and/or sensor detection of birds/wildlife/FOD, ground operations removes/disperses
- Technologically, detection is made which is automatically analyzed and assigned a risk, reviewed, and reported with automatic archiving for further analysis.
- Air Traffic Control relays information to pilot in a defined and standardized format
- Pilot makes Go/No-go decisions, procedures, FOM
 - Appropriate responses for various scenarios

Strategic:

- Airport evaluates land use, habitat, seasonal movements, biologists
- Identify level of pilot judgment regarding action/response to advisory

- Controllers monitor integrated picture
 - Can restrict/modify operations as appropriate
 - Advise flight crew of risks

Obstacles to Adoption

- Cost
- Liability for airlines, airports, pilots
- Training required for all
- Procedure development, policy and funding
- Identification of responsibilities
- Level of information/data needed versus wanted

BACKGROUND INFORMATION:

Birdstrikes and FOD-related accidents are costly to airlines as well as posing a safety hazard to aircraft and flight operations. Nationally, bird strikes have resulted in more than 550,000 hours of aircraft down time. The annual cost to civil and military aviation is more than \$625 million from engine and/or aircraft damages and flight delays (FAA data 1990-2008) and cancellations with worldwide estimates topping \$2 billion based on a 2001 study by the UK Central Science Lab. The National Aerospace FOD Prevention Inc. estimates that globally the aerospace industry loses \$4 billion annually to engine damage from FOD ingestion. With additional revenue loss due to aircraft downtime and repairs, and flight delays/cancellations, birdstrikes and FOD damages become an operational and economic factor, as well as impacting aviation safety. The industry cannot afford another hull loss accident with the potential for loss of life and therefore immediate steps must be taken to reduce the threat posed by Birdstrikes.

Although various military and civilian airports use bird radar and FOD detection technologies today, there has been no enterprise-wide deployment. Moving forward, stakeholders will need to refine data requirements for ground and airborne personnel from these detection systems and an integrated approach to implementing the systems into existing operations and procedures.

DeTect, Inc. (www.detect-inc.com) is a U.S.-based developer and manufacturer of advanced radar technologies for aviation safety, meteorology, bird control, and airspace/marine security supporting projects worldwide through offices in the US, Canada and Germany and representatives in over 80 countries. The company's MERLIN™ Aircraft Birdstrike Avoidance Radar system is the most advanced and proven bird radar available for tactical bird-aircraft strike avoidance, providing automatic real-time detection, tracking and alerting of hazardous bird activity for commercial airports and military airfields. The system, originally developed for and currently used by the US Air Force and NASA, has a well documented record of reducing birdstrikes and associated aircraft damage and delay costs with units operating since 2003. MERLIN is operational, production-model technology with over 50 systems currently operating at sites globally in aviation safety and bird control applications supported by a team of leading experts in airfield bird control, flight safety and radar engineering.