IDENTIFYING DATA GAPS IN A VOLUNTARY STRIKE REPORTING SYSTEM – ANALYSIS OF CLT STRIKE DATA, 2021-2023

AVIATION WILDLIFE MANAGEMENT CONFERENCE - 2024
MINNEAPOLIS, MINNESOTA

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Acknowledgements

- CLT Wildlife Management, Airside Operations, and Airport Operations Center staff

- National Wildlife Strike Database (NWSD) Staff

- Smithsonian Institution Feather Identification Staff

- All individuals who filed a wildlife strike report or provided information on a known or suspected wildlife strike

Voluntary Strike Reporting – What are we missing?

Wildlife strikes are like a puzzle... everybody has a different piece of information that when put together tells the whole story:

- **Flight Crew** may know when/where it happened, altitude, distance from airport, etc.

- **Airline representation (maintenance/safety/management/etc.)** may know damage info, effect on operations, cost impacts, etc.

- **Air Traffic Control** may be able to contribute additional information based on verbal reports such as number of birds/wildlife, size, location (on airfield/off airfield?), etc.

- **Airport Representation (operations)** can help verify information, collect samples for species ID, and aggregate information for reports/records, analysis, and regulatory compliance.
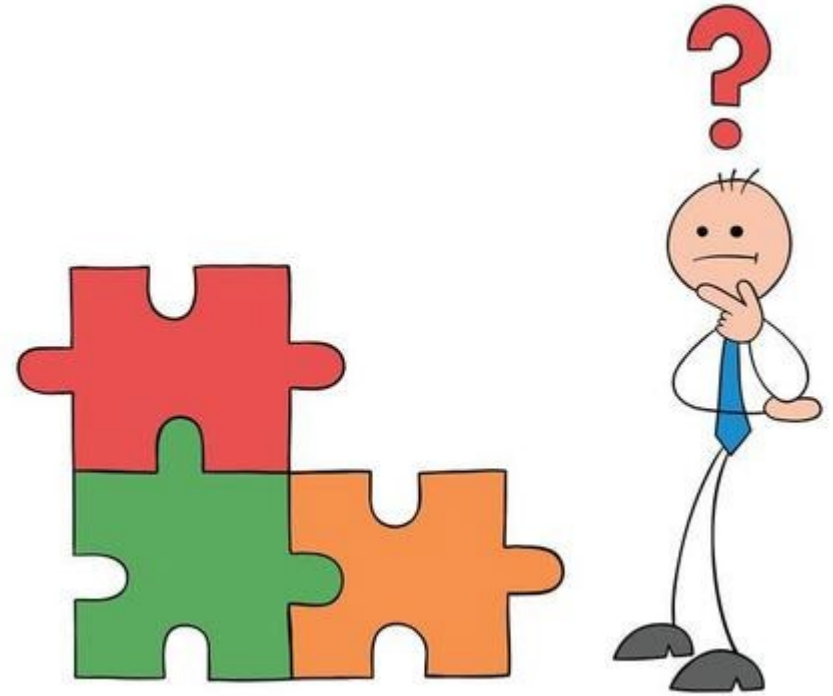
Problem Questions

- Can data gaps in a voluntary strike reporting system be identified and quantified?

- What are some of the most obvious data gaps in a voluntary strike reporting system?

- What can be done to reduce some of the most obvious and impactful data gaps?

From a higher level...

Are we capturing all relevant strike information to the maximum extent practical?

Why are we not all filing reports? Why are we not communicating?

What effects does all of this have on each stakeholder?

Sample Survey Location – CLT Airport

- Large hub airport:
    - 4 runways
    - 15 air carriers, 3 cargo operators, NC Air National Guard (C-17s), and multiple general aviation tenants
    - American Airlines hub with a large maintenance presence
- Airports Council International (ACI) Rankings for Aircraft Movements:
    - 2021: 5th busiest airport in the US with 519,895 operations
    - 2022: 7th busiest airport in the US with 505,589 operations
    - 2023: 7th busiest airport in the US with 539,066 operations
- 24/7 Staffing – Airside Operations, 40+ employees
- Wildlife Management Staffing (full time) – 2 employees

Solicitation For Wildlife Strike Data

- CLT Airport does not REQUIRE strike reporting but highly encourages it.

- Local phone number provided for reporting information on wildlife strikes.

CLT Outreach:

- Outreach surges coincide with seasonal bird migration (when strikes are known to increase)

- Awareness presentations and attendance at various meetings

- One-on-one meetings with aircraft operating tenants (periodic)

- Strike reporting awareness poster distribution

- Daily *BirdCast* Migration Forecast email communications to aircraft operating tenants during spring/fall bird migration (includes information on how to report strikes)

Birdstrike?

We Want To Know!

Please report all birdstrikes and wildlife strikes to CLT Airport Operations.

704-359-4012

Thank you for helping to improve wildlife management at Charlotte Douglas International Airport.

CLT
CHARLOTTE DOUGLAS
INTERNATIONAL AIRPORT

Collection of Wildlife Strike Data

- Local phone number provided and advertised to report wildlife strike information.

- Initial information is solicited over the phone including preliminary details:

  - Who is calling (i.e. flight crew, airline representative, ATC, etc.)

  - Aircraft information (operator, aircraft type, location of strike on the aircraft)

  - Strike information, if known (phase of flight, altitude, on/off airport environment, etc.)

Collection of Wildlife Strike Data

- CLT staff (Airside Operations or Wildlife Management) respond to all strike incidents reported to the airport to gather additional information and samples for species identification (if applicable)
- Runway safety inspection completed as soon as practical (as necessary – required for most incidents)

CLT generates a National Wildlife Strike Database report for all credible strikes reported

Samples sent to Smithsonian Feather ID Lab for species ID (if obtained)

Information for other strikes may be obtained from:

- Reconciliation with NWSD records for strikes not reported directly to CLT
- Other/Second-Hand information
  - FAA Air Traffic Control MOR (Mandatory Occurrence Reports)

Data Details

CLT staff respond to a significant number of reported wildlife strikes each year:

- **Credible Strike –** an incident meeting the criteria found in FAA Advisory Circular 150/5200-32, *Reporting Aircraft Wildlife Strikes*

- **Non-Credible Strike –** an incident suspected to be a strike, but further analysis indicates it does NOT meet the criteria found in FAA Advisory Circular 150/5200-32

  - Smithsonian Feather ID Lab analysis indicates insect or non-organic material

  - Suspected strike without supporting evidence

- Based on best available information

CLT Strike Responses Per Year - Credible and Non-Credible

Year	Credible Strikes	Non-Credible Strikes
2021 - 480 Responses	443	37
2022 - 513 Responses	472	41
2023 - 518 Responses	470	48
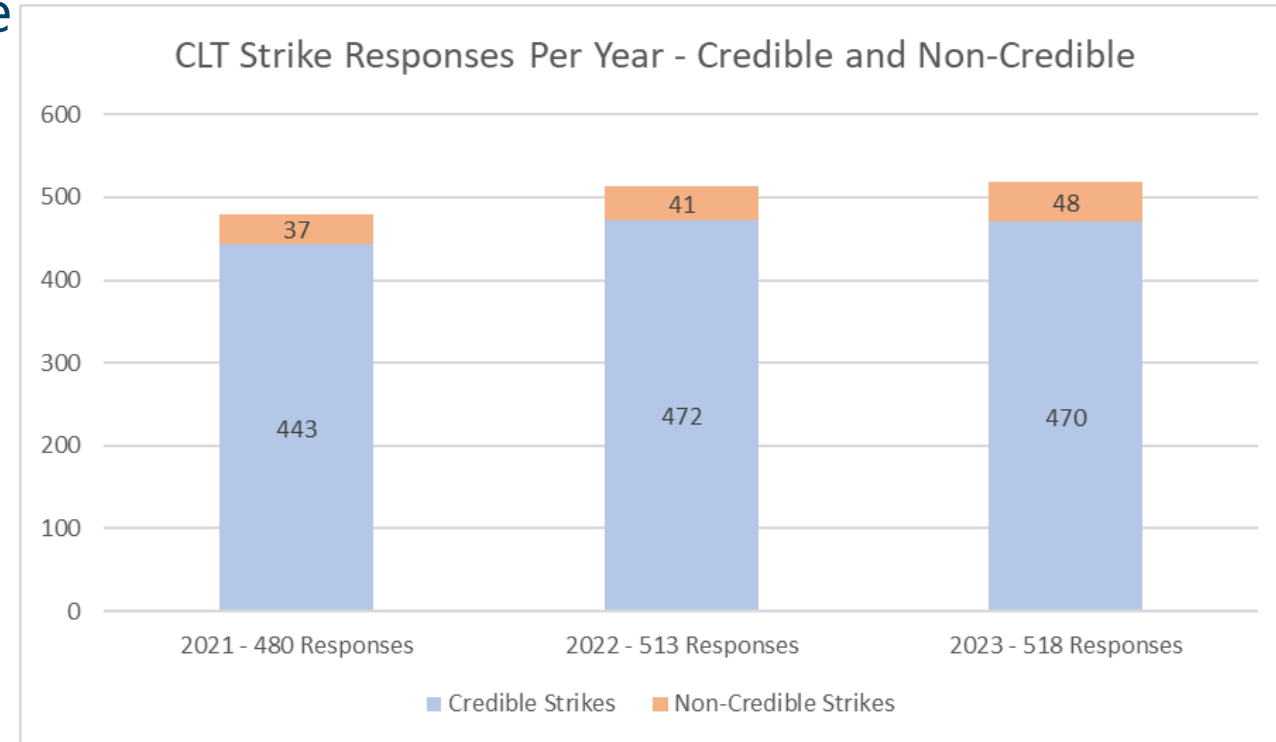
Data Aggregation and Analysis

Data from each strike response was input into Microsoft Excel spreadsheets for each year (21, 22, 23) and organized in 24 categories:

- Date
- Time
- NWSD Record Number(s)
- CLT CityWorks Number (call log)
- NWSD Filer (who filed the report)
- Additional NWSD Filer (multiple filers)
- Credible Strike Incident (Yes/No)
- Airline/Operator Name
- Flight Number
- Aircraft Registration
- Airport Credited (if known)
- Phase of Flight (if known)

- Altitude (if known)
- Distance from Airport (if known)
- Part of Aircraft Struck
- Flight Crew Aware? (Yes/No/Not Applicable)
- ATC Aware? (Yes/No/Not Applicable)
- Triggering Event? (Yes/No per CFR Part 139.337)
- Was CLT Informed? (Yes/No)
- Who Informed CLT? (caller/reporter)
- Species ID Sample Collected? (Yes/No)
- Reason Sample Not Collected (if No)
- Was Species Identified? (Yes/No/Not Applicable)
- Species

*Data was aggregated from NWSD records and CLT internal data from each reported incident.

Findings 1 – Who Is (or isn't) Filing Strike Reports

2021 NWSD Reports Filed –

- One Reporter – 349 incidents
- Multiple Reporters – 94 incidents

Who is filing reports?

- Airport Personnel (CLT or Other Airport) – 432 / 443 (97.51%)
- Flight Crew – 57 / 443 (12.86%)
- NWSD Add / MOR / ATC Info – 52 / 443 (11.73%)
- Unknown / Anonymous – 13 / 443 (2.93%)
- Airline/Aircraft Maintenance – 0 / 472 (0.00%)
- Airline/Aircraft Other – 0 / 472 (0.00%)

2022 NWSD Reports Filed –

- Single Reporter – 373 incidents
- Multiple Reporters – 99 incidents

Who is filing reports?

- Airport Personnel (CLT or Other Airport) – 470 / 472 (99.58%)
- Flight Crew – 58 / 472 (12.29%)
- NWSD Add / MOR Info – 49 / 472 (10.38%)
- Unknown / Anonymous – 11 / 472 (2.33%)
- Airline/Aircraft Maintenance – 0 / 472 (0.00%)
- Airline/Aircraft Other – 0 / 472 (0.00%)

2023 NWSD Reports Filed –

- Single Reporter – 384 incidents
- Multiple Reporters – 86 incidents

Who is filing reports?

- Airport Personnel (CLT or Other Airport) – 462 / 470 (98.29%)
- Flight Crew – 68 / 470 (14.46%)
- NWSD Add / MOR / ATC Info – 53 / 470 (11.27%)
- Unknown / Anonymous – 7 / 470 (1.48%)
- Airline/Aircraft Maintenance – 0 / 470 (0.00%)
- Airline/Aircraft Other – 0 / 472 (0.00%)

Identified Data Gaps:

- Low number of NWSD reports filed from flight crews (median 13.20%)
- Aircraft maintenance and other airline representation are not filing NWSD reports

Possible Contributing Factors:

- CLT Airport response (collecting information and samples)
- Assumption culture – somebody else must be reporting it

Findings 2 – Where Strikes Occur

Airports Credited (2021)

KCLT: 42.21%
Other Airport: 8.58%
Unknown: 49.21%
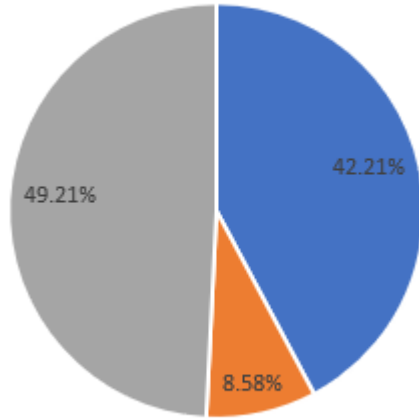
Legend: ■ KCLT ■ Other Airport ■ Unknown

Airports Credited (2022)

0.22%
KCLT: 43.00%
Other Airport: 9.75%
Unknown: 47.03%
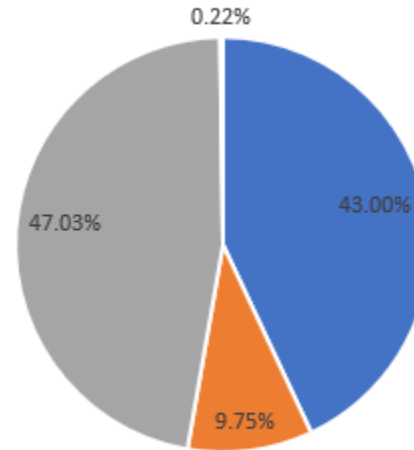
Legend: ■ KCLT ■ Other Airport ■ Unknown ■ No Airport (occurred en route)

Airports Credited (2023)

KCLT: 41.28%
Other Airport: 8.08%
Unknown: 50.64%
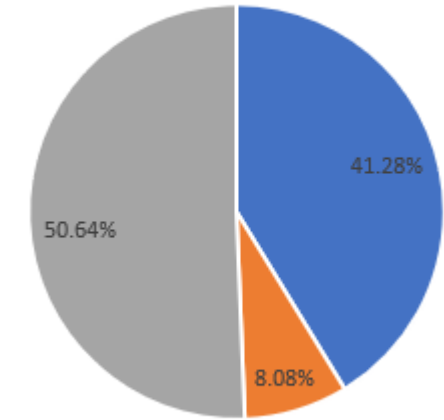
Legend: ■ KCLT ■ Other Airport ■ Unknown

Identified Data Gap:

- Nearly half of credible strikes annually do not indicate where the strike incident occurred.

Possible Contributing Factors:

- Flight crews may be unaware they incurred a wildlife strike –
  - Crew did not see/hear the strike, or did not see birds
  - Strike occurred during low visibility (night, poor weather/visibility)
  - Strike occurred out of visible range of the flight deck (wing, tail, underbelly, etc.)

Findings 3 – Impacts of Information from Flight Crews

2021 Flight Crew Knowledge of Strikes –

- FC was aware of the strike and provided input – 174 / 443 (39.27%)
- FC NOT aware of the strike but provided input (found on inspection) – 13 / 443 (2.93%)
- No FC Input / Unknown FC Awareness – 256 / 443 (57.78%)

2022 Flight Crew Knowledge of Strikes –

- FC was aware of the strike and provided input – 184 / 472 (38.98%)
- FC NOT aware of the strike but provided input (found on inspection) – 14 / 472 (2.97%)
- No FC Input / Unknown FC Awareness – 274 / 472 (58.05%)

2023 Flight Crew Knowledge of Strikes –

- FC was aware of the strike and provided input – 167 / 470 (35.53%)
- FC NOT aware of the strike but provided input (found on inspection) – 11 / 470 (2.34%)
- No FC Input / Unknown FC Awareness – 292 / 470 (62.12%)

Flight Crew Awareness and Input 2021

- Flight Crew Aware or Provided Input
- Unknown Flight Crew Awareness or No Flight Crew Input
- Flight Crew Found on Inspection
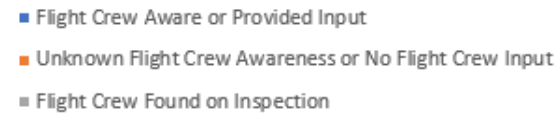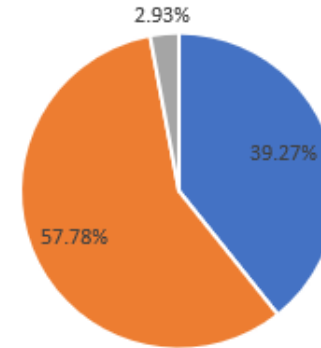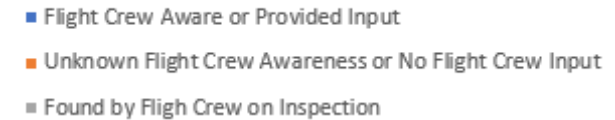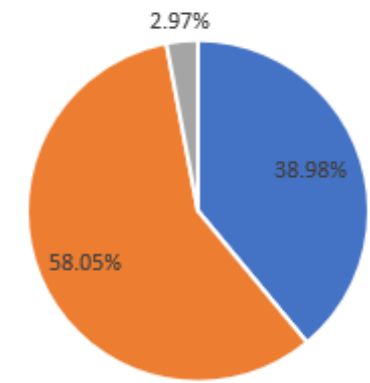
Flight Crew Awareness and Input 2022

- Flight Crew Aware or Provided Input
- Unknown Flight Crew Awareness or No Flight Crew Input
- Found by Fligh Crew on Inspection

Flight Crew Awareness and Input 2023

- Flight Crew Aware or Provided Input
- Unknown Flight Crew Awareness or No Flight Crew Input
- Found by Flight Crew on Inspection
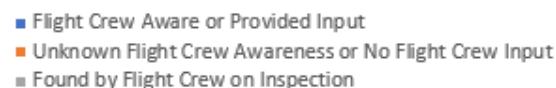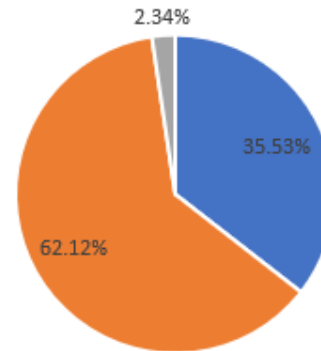
Findings 3 – Impacts of Information from Flight Crews

2021 NWSD Reports Filed by Flight Crew –

- 57 incidents FC filed NWSD Report / 187 incidents FC had strike awareness (30.48%)

Impact of Flight Crew Knowledge –

- Airport Reported – 172 / 174 (98.85%)
- Phase of Flight Reported – 173 / 184 (99.42%)
- Altitude Reported – 125 / 174 (71.83%)
- Distance from Airport Reported – 96 / 174 (55.17%)

2022 NWSD Reports Filed by Flight Crew –

- 58 incidents FC filed NWSD Report / 198 incidents FC had strike awareness (29.29%)

Impact of Flight Crew Knowledge –

- Airport Reported – 183 / 184 (99.46%)
- Phase of Flight Reported – 184 / 184 (100.00%)
- Altitude Reported – 140 / 184 (76.09%)
- Distance from Airport Reported – 110 / 184 (59.78%)

2023 NWSD Reports Filed by Flight Crew –

- 68 incidents FC filed NWSD Report / 178 incidents FC had strike awareness (38.20%)

Impact of Flight Crew Knowledge –

- Airport Reported – 167 / 167 (100.00%)
- Phase of Flight Reported – 167 / 167 (100.00%)
- Altitude Reported – 120 / 167 (71.85%)
- Distance from Airport Reported – 95 / 167 (56.88%)

Flight Crew input provides critical information often not obtained otherwise.

Identified Data Gap:

- A median of 67.34% of strikes with flight crew awareness are not resulting in NWSD reports filed by the flight crew

Possible Contributing Factors:

- Flight crew ARE reporting strikes through internal reporting systems (maintenance logs, etc.) and do not know this information is not resulting in NWSD reports
- CLT Airport Response (collecting information and samples)

CLT

Findings 4 – Impact of Species Identification

2021 Species Identifications –

- Sample Collected – 366 / 443 (82.61%)
- Species Identified – 360 / 443 (81.26%)
- Species Identification for Strikes Departing CLT – 4 / 27 (14.81%)
- Reasons Sample Not Collected –
  - Cleaned / Discarded – 24
  - CLT Not Informed – 18
  - Departure (no sample collected at destination) – 22
  - Inaccessible to Collect – 1
  - No Remains Found to Collect – 12

2022 Species Identifications –

- Sample Collected – 396 / 472 (83.89%)
- Species Identified – 391 / 472 (82.83%)
- Species Identification for Strikes Departing CLT – 8 / 29 (27.58%)
- Reasons Sample Not Collected –
  - Aircraft Not Located – 1
  - Cleaned / Discarded – 25
  - CLT Not Informed – 17
  - Departure (no sample collected at destination) – 19
  - Inaccessible – 1
  - No Remains Found – 11
  - Unable to Respond – 2

2023 Species Identifications –

- Sample Collected – 399 / 470 (84.89%)
- Species Identified – 390/470 (82.97%)
- Species Identification for Strikes Departing CLT – 5 / 23 (21.73%)
- Reasons Sample Not Collected –
  - Cleaned / Discarded – 20
  - CLT Not Informed – 23
  - Departure (no sample collected at destination) – 15
  - Inaccessible to Collect – 2
  - No Remains Found to Collect – 11

Identified Data Gaps:

- Low species ID for strikes departing CLT – median 78.63% w/no species ID despite strike reported
- Species ID data lost from remains cleaned/discarded without/before sample collection

Possible Contributing Factors:

- Collection of samples for species ID is not consistent from airport to airport (emphasis? staffing? who is responsible… operator vs airport? who to contact? etc.)
- Do operators know who and how to contact for sampling? Should operators be collecting?
- Education on the importance of sampling for species identification

CLT

Findings 5 – Is the Airport Being Informed?

Not uncommon for an airport to learn of a strike long after it has occurred – usually when a strike report is filed. Can lead to lost data (i.e. no sample collected for species ID, etc.).

CLT was NOT informed of a strike incident at the following rates:

- 2021 – 33/404 (8.17%)
- 2022 – 34/428 (7.94%)   MEDIAN – 8.23%
- 2023 – 36/420 (8.57%)

Extremely low at this airport – but not likely the case for all airports.

Identified Data Gap:

- Airports are not always getting timely information about strike incidents (more lost data)

Possible Contributing Factor:

- Do operators know who and how to contact airports with information?

Summary of Information Gaps from Dataset

1. Flight Crew only filed strike reports with the NWSD for ~13% of total incidents analyzed despite indicating awareness of the strike in ~40% of total incidents

2. Records without Flight Crew input significantly lack critical information including:

    - Airport/Airspace associated with the strike   -- Phase of flight
    - Distance from airport (on or off airport?)   -- Altitude

3. Airline/Operator representation other than Flight Crew (i.e. aircraft maintenance, safety management, etc.) are NOT filing NWSD strike reports

4. ~50% of credible strikes do not identify when or where the strike occurred

5. Sampling for species identification is highly inconsistent across airports and airlines/operators resulting in varied rates of collection

6. Airports are not always being informed that a strike incident has occurred, even when it happened at their facility/airspace (delay in notification)

Bridging Data Gaps – Ideas and Practices

Policy –

- Should the industry reconsider "voluntary" strike data reporting?

Education –

- Local education/outreach works… at the local level

- More education/outreach industry wide?

- Reconsider approaches – how effective are current/traditional outreach and education efforts? What return are we getting from them?

Leveraging Technology –

- "Yesterday's solutions will not solve today's problems"…

- Inclusion of near-real time wildlife hazard information and strike reporting processes into flight planning/flight management software? Real-time notifications to others?

- Must consider ALL impacted users (i.e. flight crews, airline operations, aircraft maintenance, ATC), not just Airport Management and Regulators (FAA, etc.) What would these stakeholders like to see?

CLT Airport – outreach signs directed to flight crews

Conclusion and Further Research

- Data gaps in a voluntary strike reporting system can be quantified through aggregation and analysis.

- Consideration for reducing the most obvious or impactful data gaps should be given prioritization.

- Implementation of measures to reduce data gaps may need to occur at the local level or may need to occur industry wide.

Further Research Questions –

1. Do the findings from this analysis correlate to other airports or nationally? If not, what are the differences (and hypothesis why)?

2. How do differences in outreach and education (locally and nationally) effect data gaps?

3. What data is important to each stakeholder (airports, flight crews, airlines, ATC, etc.) and how do data gaps impact each?

Thank you for your attendance! Questions?

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