Business needs of the Final Paper

for the CEU MSc in Business Analytics program

Gábor Horváth

2017



1 Introduction

The structure of the document follows the Cross Industry Standard Process for Data Mining (CRISP-DM) process model, which is a non-proprietary, documented, and freely available data mining model (Shearer 2000). Whenever the model sections can be matched to (and can fulfill) the requirements stated by CEU for the Final Paper I'm using the appropriate section identified by the CRIPS-DM model. Please keep in mind that the model supports the full end-to-end process of a data mining project, but the project does not require the use of all the model elements.

2 Business understanding

2.1 Determine Business Objectives

2.1.1 Business Objectives

There are two main objectives what the project is aiming to complete.

- 1. Create a statistical analysis to identify those reasons (based on the data available), which are determining the the risk of an animal strike for an airport.
- 2. Create a prediction model, which can be used to predict the risk of an animal strike for a given flight.

The result of the statistical analysis could be used in the completition of the model building and evaluation the recommended order of the completition is the order of the objectives stated above.

2.1.2 Business Success Criteria

- · Identification of features determining the risk potential of an airport
- Working model for animal strike prediction

2.2 Assess Situation

2.2.1 Inventory of resources

- Flight Data
- · Animal Strike Data
- R
- · Buckets

2.2.2 Requirements, Assumptions, and Constraints

- Additional requirements:
 - No additional requirements identified on top of the requirements already stated in this document.
- Assumptions
 - No initial assumptions made.
- Constraints
 - No initial hard constraints identified.

2.2.3 Risks and Contingencies

- Risks
 - No initial risks identified
- Contingencies
 - No initial contingencies identified

2.2.4 Terminology

The project is using different terminologies from the different domains. The terms/definitions used will not be marked or explained in details, if based on the context the reader can easily identify the domain of the particular term. In case there are uncertainties about a term (and it's not explained in the paper), the following sources can be used for the definitions:

- Aviation:
 - Aviation Terms / Directory
 - Aviation Glossary
 - Aviation Glossaries
- · Data Mining
 - Data Mining Glossary
 - Data Mining Terminologies
 - Data Mining and Predictive Analytics Glossary
- Data Science / Big Data
 - Data Science Glossary
 - Analytics and Big Data Glossary
 - Data Science Glossary

2.2.5 Costs and Benefits

This is a one-man project, no significant cost is expected. Main benefit is to put to and almost end-to-end scenario the topics covered during the courses and discovering bits and bolts of the techniques for creating the project.

2.3 Determine Data Mining Goals

2.3.1 Data Mining Goals

- · Understand, Analyse, Clean and Merge the source data correctly
- Create the required attributes
- Generate the required records (if applicable)

2.3.2 Data Mining Success Criteria

- · Identification of featured determining the risk potential of an airport
- · Working model for animal strike prediction

2.4 Produce Project Plan

2.4.1 Project Plan

The project is managed in an agile way, where all the tasks, requirements, issues, solutions, and ideas are kept in a project at buckets.

2.4.2 Initial Assessment of Tools and Techniques

- Programming language:
 - R
- GUI for the programming language:
 - RStudio
- Documentation is created using:
 - knitr
 - MiKTeX
 - ReporteRs
- Data visualisation:
 - ggplot2

- Data manipulation:
 access2csv
 dtplyr
- Project plan / task management:
 - Buckets
- Source code repository:
 - GitHub

Note: The list above do not contain the list of all the tools and packages used to create the project, but the full list will be provided in the source code.

3 Data Understanding

3.1 Collect Initial Data

3.1.1 Initial Data Collection Report

This report will be part of the following documents:

- · Preliminary Report
- Final Paper

3.2 Describe Data

3.2.1 Data Description Report

The two main data sources have the following column explanations, which is attached to the downloaded files as well, by the data provider agecies.

3.2.1.1 Flight data

Column name	Explanation of Column Name and Codes
Year	Year
Quarter	Quarter (1-4)
Month	Month
DayofMonth	Day of Month
DayOfWeek	Day of Week
FlightDate	Flight Date (yyyymmdd)
UniqueCarrier	Unique Carrier Code. When the same code has been used by multiple carriers, a numeric suffix is used for earlier users, for example, PA, PA(1), PA(2). Use this field for analysis across a range of years.
AirlineID	An identification number assigned by US DOT to identify a unique airline (carrier A unique airline (carrier) is defined as one holding and reporting under the same DOT certificate regardless of its Code, Name, or holding company/corporation.
Carrier	Code assigned by IATA and commonly used to identify a carrier. As the same code may have been assigned to different carriers over time, the code is not always unique. For analysis, use the Unique Carrier Code.
TailNum	Tail Number
FlightNum	Flight Number
OriginAirportID	Origin Airport, Airport ID. An identification number assigned by US DOT to identify a unique airport. Use this field for airport analysis across a range of years because an airport can change its airport code and airport codes can be reused.
OriginAirportSeqID	Origin Airport, Airport Sequence ID. An identification number assigned by US DOT to identify a unique airport at a given point of time. Airport attributes, such as airport name or coordinates, may change over time.
OriginCityMarketID	Origin Airport, City Market ID. City Market ID is an identification number assigned by US DOT to identify a city market. Use this field to consolidate airports serving the same city market.
Origin	Origin Airport
OriginCityName	Origin Airport, City Name
OriginState	Origin Airport, State Code
OriginStateFips	Origin Airport, State Fips
OriginStateName	Origin Airport, State Name

Column name	Explanation of Column Name and Codes					
OriginWac	Origin Airport, World Area Code					
DestAirportID	Destination Airport, Airport ID. An identification number assigned by US DOT to					
	identify a unique airport. Use this field for airport analysis across a range of years					
	because an airport can change its airport code and airport codes can be reused.					
DestAirportSeqID	Destination Airport, Airport Sequence ID. An identification number assigned by					
	US DOT to identify a unique airport at a given point of time. Airport attributes,					
	such as airport name or coordinates, may change over time.					
DestCityMarketID	Destination Airport, City Market ID. City Market ID is an identification number					
	assigned by US DOT to identify a city market. Use this field to consolidate					
	airports serving the same city market.					
Dest	Destination Airport					
DestCityName	Destination Airport, City Name					
DestState	Destination Airport, State Code					
DestStateFips	Destination Airport, State Fips					
DestStateName	Destination Airport, State Name					
DestWac	Destination Airport, World Area Code					
CRSDepTime	CRS Departure Time (local time: hhmm)					
DepTime	Actual Departure Time (local time: hhmm)					
DepDelay	Difference in minutes between scheduled and actual departure time. Early					
D D I M' /	departures show negative numbers.					
DepDelayMinutes	Difference in minutes between scheduled and actual departure time. Early					
DamDal15	departures set to 0.					
DepDel15	Departure Delay Indicator, 15 Minutes or More (1=Yes)					
DepartureDelayGroups	Departure Delay intervals, every (15 minutes from <-15 to >180)					
DepTimeBlk TaxiOut	CRS Departure Time Block, Hourly Intervals					
WheelsOff	Taxi Out Time, in Minutes Wheels Off Time (local time: hhmm)					
WheelsOn	Wheels On Time (local time: hhmm) Wheels On Time (local time: hhmm)					
TaxiIn	Taxi In Time, in Minutes					
CRSArrTime	CRS Arrival Time (local time: hhmm)					
ArrTime	Actual Arrival Time (local time: hhmm)					
ArrDelay	Difference in minutes between scheduled and actual arrival time. Early arrivals					
Milbelay	show negative numbers.					
ArrDelayMinutes	Difference in minutes between scheduled and actual arrival time. Early arrivals set					
Timbolayimacos	to 0.					
ArrDel15	Arrival Delay Indicator, 15 Minutes or More (1=Yes)					
ArrivalDelayGroups	Arrival Delay intervals, every (15-minutes from <-15 to >180)					
ArrTimeBlk	CRS Arrival Time Block, Hourly Intervals					
Cancelled	Cancelled Flight Indicator (1=Yes)					
CancellationCode	Specifies The Reason For Cancellation					
Diverted	Diverted Flight Indicator (1=Yes)					
CRSElapsedTime	CRS Elapsed Time of Flight, in Minutes					
ActualElapsedTime	Elapsed Time of Flight, in Minutes					
AirTime	Flight Time, in Minutes					
Flights	Number of Flights					
Distance	Distance between airports (miles)					
DistanceGroup	Distance Intervals, every 250 Miles, for Flight Segment					
CarrierDelay	Carrier Delay, in Minutes					
WeatherDelay	Weather Delay, in Minutes					
NASDelay	National Air System Delay, in Minutes					
SecurityDelay	Security Delay, in Minutes					
LateAircraftDelay	Late Aircraft Delay, in Minutes					

Column name	Explanation of Column Name and Codes
FirstDepTime	First Gate Departure Time at Origin Airport
TotalAddGTime	Total Ground Time Away from Gate for Gate Return or Cancelled Flight
LongestAddGTime	Longest Time Away from Gate for Gate Return or Cancelled Flight
DivAirportLandings	Number of Diverted Airport Landings
DivReachedDest	Diverted Flight Reaching Scheduled Destination Indicator (1=Yes)
DivActualElapsedTime	Elapsed Time of Diverted Flight Reaching Scheduled Destination, in Minutes. The
-	ActualElapsedTime column remains NULL for all diverted flights.
DivArrDelay	Difference in minutes between scheduled and actual arrival time for a diverted flight reaching scheduled destination. The ArrDelay column remains NULL for all diverted flights.
DivDistance	Distance between scheduled destination and final diverted airport (miles). Value will be 0 for diverted flight reaching scheduled destination.
Div1Airport	Diverted Airport Code1
Div1AirportID	Airport ID of Diverted Airport 1. Airport ID is a Unique Key for an Airport
Div1AirportSeqID	Airport Sequence ID of Diverted Airport 1. Unique Key for Time Specific
• •	Information for an Airport
Div1WheelsOn	Wheels On Time (local time: hhmm) at Diverted Airport Code1
Div1TotalGTime	Total Ground Time Away from Gate at Diverted Airport Code1
Div1LongestGTime	Longest Ground Time Away from Gate at Diverted Airport Code1
Div1WheelsOff	Wheels Off Time (local time: hhmm) at Diverted Airport Code1
Div1TailNum	Aircraft Tail Number for Diverted Airport Code1
Div2Airport	Diverted Airport Code2
Div2AirportID	Airport ID of Diverted Airport 2. Airport ID is a Unique Key for an Airport
Div2AirportSeqID	Airport Sequence ID of Diverted Airport 2. Unique Key for Time Specific
1 1	Information for an Airport
Div2WheelsOn	Wheels On Time (local time: hhmm) at Diverted Airport Code2
Div2TotalGTime	Total Ground Time Away from Gate at Diverted Airport Code2
Div2LongestGTime	Longest Ground Time Away from Gate at Diverted Airport Code2
Div2WheelsOff	Wheels Off Time (local time: hhmm) at Diverted Airport Code2
Div2TailNum	Aircraft Tail Number for Diverted Airport Code2
Div3Airport	Diverted Airport Code3
Div3AirportID	Airport ID of Diverted Airport 3. Airport ID is a Unique Key for an Airport
Div3AirportSeqID	Airport Sequence ID of Diverted Airport 3. Unique Key for Time Specific Information for an Airport
Div3WheelsOn	Wheels On Time (local time: hhmm) at Diverted Airport Code3
Div3TotalGTime	Total Ground Time Away from Gate at Diverted Airport Code3
Div3LongestGTime	Longest Ground Time Away from Gate at Diverted Airport Code3
Div3WheelsOff	Wheels Off Time (local time: hhmm) at Diverted Airport Code3
Div3TailNum	Aircraft Tail Number for Diverted Airport Code3
Div4Airport	Diverted Airport Code4
Div4AirportID	Airport ID of Diverted Airport 4. Airport ID is a Unique Key for an Airport
Div4AirportSeqID	Airport Sequence ID of Diverted Airport 4. Unique Key for Time Specific
1 1	Information for an Airport
Div4WheelsOn	Wheels On Time (local time: hhmm) at Diverted Airport Code4
Div4TotalGTime	Total Ground Time Away from Gate at Diverted Airport Code4
Div4LongestGTime	Longest Ground Time Away from Gate at Diverted Airport Code4
Div4WheelsOff	Wheels Off Time (local time: hhmm) at Diverted Airport Code4
Div4TailNum	Aircraft Tail Number for Diverted Airport Code4
Div5Airport	Diverted Airport Code5
Div5AirportID	Airport ID of Diverted Airport 5. Airport ID is a Unique Key for an Airport
Div5AirportSeqID	Airport Sequence ID of Diverted Airport 5. Unique Key for Time Specific Information for an Airport

Column name	Explanation of Column Name and Codes
Div5WheelsOn	Wheels On Time (local time: hhmm) at Diverted Airport Code5
Div5TotalGTime	Total Ground Time Away from Gate at Diverted Airport Code5
Div5LongestGTime	Longest Ground Time Away from Gate at Diverted Airport Code5
Div5WheelsOff	Wheels Off Time (local time: hhmm) at Diverted Airport Code5
Div5TailNum	Aircraft Tail Number for Diverted Airport Code5

3.2.1.2 Animal strike data

Column name	Explanation of Column Name and Codes
INDEX NR	Individual record number
OPID	Airline operator code
OPERATOR	A three letter International Civil Aviation Organization code for aircraft
	operators. (BUS = business, PVT = private aircraft other than business,
	GOV = government aircraft, MIL - military aircraft.)
ATYPE	Aircraft
AMA	International Civil Aviation Organization code for Aircraft Make
AMO	International Civil Aviation Organization code for Aircraft Model
EMA	Engine Make Code (see Engine Codes tab below)
EMO	Engine Model Code (see Engine Codes tab below)
AC_CLASS	Type of aircraft (see Aircraft Type tab below)
AC_MASS	1 = 2,250 kg or less: 2 = ,2251-5700 kg: 3 = 5,701-27,000 kg: 4 =
	27,001-272,000 kg: $5 = above 272,000 kg$
NUM_ENGS	Number of engines
TYPE_ENG	Type of power A = reciprocating engine (piston): B = Turbojet: C =
	Turboprop: D = Turbofan: E = None (glider): F = Turboshaft (helicopter): Y
	= Other
ENG_1_POS	Where engine # 1 is mounted on aircraft (see Engine Position tab below)
ENG_2_POS	Where engine # 2 is mounted on aircraft (see Engine Position tab below)
ENG_3_POS	Where engine #3 is mounted on aircraft (see Engine Position tab below)
ENG_4_POS	Where engine # 4 is mounted on aircraft (see Engine Position tab below)
REG	Aircraft registration
FLT	Flight number
REMAINS_COLLECTED	Indicates if bird or wildlife remains were found and collected
REMAINS_SENT	Indicates if remains were sent to the Smithsonian Institution for identification
INCIDENT_DATE	Date strike occurred
INCIDENT_MONTH	Month strike occurred
INCIDENT_YEAR	Year strike occurred
TIME_OF_DAY	Light conditions
TIME	Hour and minute in local time
AIRPORT_ID	International Civil Aviation Organization airport identifier for location of
	strike whether it was on or off airport
AIRPORT	Name of airport
STATE	State
FAAREGION	FAA Region where airport is located
ENROUTE	If strike did not occur on approach, climb, landing roll, taxi or take-off,
	aircraft was enroute. This shows location.
RUNWAY	Runway
LOCATION	Various information about aircraft location if enroute or airport where strike
	evidence was found. Some locations show the two airports for the flight
	departure and arrival if pilot was unaware of the strike.
HEIGHT	Feet Above Ground Level

SPEED DISTANCE DISTANCE Miles from airport PHASE_OF_ELT DAMAGE Blank Unknown M = minor When the aircraft can be rendered airworthy by simple repairs or replacements and an extensive inspection is not necessary. The aircraft was damaged, but details as to the extent of the damage are lacking. S = substantial When the aircraft incurs damage or structural failure which adversely affects the structure strength, performance or flight characteristics of the aircraft and which would normally require major repair or replacement of the affected component. D = Destroyed When the damage sustained makes it inadvisable to restore the aircraft and which would normally require major repair or replacement of the affected component. STR_RAD Struck radome DAM_WINDSHLD DAM_RAD Damaged andome STR_WINDSHLD STR_KOSE STR_KOSE STR_KOSE DAM_NOSE STR_KOSE DAM_ENGI STR_KOSE DAM_ENGI STR_KOSE DAM_ENGI STR_KOSE DAM_ENGI DAM_E	Column name	Explanation of Column Name and Codes					
PHASE OF FLT DAMAGE Blank Unknown M = minor When the aircraft can be rendered airworthy by simple repairs or replacements and an extensive inspection is not necessary. M? = uncertain level The aircraft was damaged, but details as to the extent of the damage are lacking. When the aircraft incurs damage or structural failure which adversely affects the structure strength, performance or flight characteristics of the aircraft and which would normally require major repair or replacement of the affected component. D = Destroyed When the damage sustained makes it inadvisable to restore the aircraft to an airworthy condition. STR_RAD Struck radome DAM_RAD Damaged radome STR_WINDSHLD Struck windshield DAM_WINDSHLD DAM_WINDSHLD Damaged windshield DAM_MOSE DAM_ROSE Struck Engine 1 DAM_ENG1 DAM_ENG2 Struck Engine 2 DAM_ENG2 Struck Engine 2 Struck Engine 2 Struck Engine 2 DAM_ENG3 DAM_ENG3 Damaged Engine 3 Struck Engine 3 Struck Engine 3 Struck Engine 4 DAM_ENG4 DAM_ROSE STR_ENG4 DAM_ROSE STR_ENG5 DAM_ROSE STR_ENG6 Struck Engine 4 DAM_ENG6 DAM_ROSE STR_ENG6 Struck Engine 6 DAM_ROSE STR_ENG9 Struck Propeller STR_ENG STR_ENG9 Struck Propeller STR_FOP DAM_ROSE STR_ENG0 DAM_ROSE STR_ENG1 DAM_ROSE STR_ENG1 DAM_GROT	SPEED	Knots (indicated air speed)					
DAMAGE Blank	DISTANCE	Miles from airport					
Blank Unknown M = minor When the aircraft can be rendered airworthy by simple repairs or replacements and an extensive inspection is not necessary. M? = uncertain level The aircraft was damaged, but details as to the extent of the damage are lacking. S = substantial When the aircraft incurs damage or structural failure which adversely affects the structure strength, performance or flight characteristics of the aircraft and which would normally require major repair or replacement of the affected component. D = Destroyed When the damage sustained makes it inadvisable to restore the aircraft to an airworthy condition. STR_RAD Struck radome STR_RAD Damaged radome STR_ROB Struck radome STR_NUNDSHLD Damaged radome STR_NUNDSHLD Struck windshield STR_NUNDSHLD Damaged nose STR_ENG Struck sundshield DAM_STR_NOSE Struck sundshield STR_ENGS Struck sundshield STR_ENGI Struck Engine 2 STR_ENGI <t< td=""><td>PHASE_OF_FLT</td><td>Phase of flight during which strike occurred</td></t<>	PHASE_OF_FLT	Phase of flight during which strike occurred					
M = minor When the aircraft can be rendered airworthy by simple repairs or replacements and an extensive inspection is not necessary. M? = uncertain level The aircraft was damaged, but details as to the extent of the damage are lacking. S = substantial When the aircraft incurs damage or structural failure which adversely affects the structure strength, performance or flight characteristics of the aircraft and which would normally require major repair or replacement of the affected component. D = Destroyed When the damage sustained makes it inadvisable to restore the aircraft to an airworthy condition. STR_RAD Struck radome DAM_RAD Damaged radome STR_WINDSHLD Damaged airdome STR_WINDSHLD Damaged windshield STR_NOSE Struck masked DAM_NOSE Struck nose DAM_NOSE Struck nose DAM_ENG1 Damaged Engine 1 STR_ENG2 Struck Engine 2 DAM_ENG3 Damaged Engine 2 STR_ENG3 Struck Engine 3 DAM_ENG3 Damaged Engine 3 STR_ENG4 Struck Engine 4 DAM_ENG4 Damaged Engine 4 NAM_ENG4 Struck Engine 9 STR_ENG4 Struck	DAMAGE						
replacements and an extensive inspection is not necessary. The aircraft was damaged, but details as to the extent of the damage are lacking. S = substantial When the aircraft incurs damage or structural failure which adversely affects the structure strength, performance or flight characteristics of the aircraft and which would normally require major repair or replacement of the affected component. D = Destroyed When the damage sustained makes it inadvisable to restore the aircraft and airworthy condition. STR_RAD Struck radome DAM_RAD Damaged radome STR_WINDSHLD Struck windshield DAM_WINDSHLD Damaged windshield STR_NOSE STR_ENG1 DAM_ENG1 Damaged engine 1 DAM_ENG1 DAM_ENG1 DAM_ENG2 STR_ENG2 Struck Engine 1 DAM_ENG2 DAM_ENG2 STR_ENG3 Struck Engine 2 DAM_ENG3 STR_ENG3 DAM_ENG3 Damaged Engine 2 STR_ENG3 DAM_ENG3 Damaged Engine 3 DAM_ENG3 Damaged Engine 3 DAM_ENG4 DAM_ENG4 DAM_ENG4 DAM_ENG5 Damaged Engine 4 DAM_ENG4 DAM_ENG4 DAM_ENG5 Damaged Engine 4 DAM_ENG4 DAM_ENG5 Damaged Engine 4 DAM_ENG4 Damaged Engine 4 DAM_ENG5 Damaged Engine 5 STR_ENG4 Damaged Engine 6 Damaged Engine 7 STR_ENG4 Damaged Engine 8 Struck Engine 9 DAM_ENG5 STR_ENG4 Damaged Engine 9 STR_ENG4 DAM_ENG5 STR_ENG6 Damaged Engine 9 STR_ENG8 STR_ENG8 Damaged Engine 9 STR_ENG9 Damaged Propeller STR_WING_ROT STR_EUSE Damaged Wing or Rotor STR_FUSE Damaged Wing or Rotor STR_FUSE Damaged Fuselage STR_LG STR_LG STRUCk Landing Gear DAM_LG STR_LG STRUCk Landing Gear DAM_LG STR_LGHTS STR_LGHTS STR_LGHTS STR_LGHTS STR_LGHTS STR_LGHTS STR_LGHTS Damaged Lights STR_COTHER Dama	Blank	Unknown					
M? = uncertain level The aircraft was damaged, but details as to the extent of the damage are lacking. S = substantial When the aircraft incurs damage or structural failure which adversely affects the structure strength, performance or flight characteristics of the aircraft and which would normally require major repair or replacement of the affected component. D = Destroyed When the damage sustained makes it inadvisable to restore the aircraft to an airworthy condition. STR_RAD Struck radome DAM_RAD Damaged radome STR_WINDSHLD Damaged windshield DAM_WINDSHLD Damaged windshield STR_ROSE Struck nose DAM_NOSE Damaged spine 1 STR_ENGI Struck Engine 2 DAM_ENGI Damaged Engine 1 STR_ENG2 Struck Engine 2 DAM_ENG3 Struck Engine 2 DAM_ENG3 Struck Engine 3 STR_ENG4 Struck Engine 4 DAM_ENG4 Damaged Engine 4 DAM_ENG4 Damaged Engine 4 DAM_ENG4 Damaged Engine 1 STR_PROP Damaged Propeller STR_WING_ROT Damaged Wing or Rotor STR_WING_ROT Damaged Puse	M = minor	When the aircraft can be rendered airworthy by simple repairs or					
S = substantial When the aircraft incurs damage or structural failure which adversely affects the structure strength, performance or flight characteristics of the aircraft and which would normally require major repair or replacement of the affected component. D = Destroyed When the damage sustained makes it inadvisable to restore the aircraft to an airworthy condition. STR_RAD Struck radome DAM_RAD Damaged radome STR_WINDSHLD Struck windshield DAM_WINDSHLD Damaged windshield DAM_WINDSHLD Damaged windshield STR_NOSE Damaged nose STR_ENG1 Struck Engine 1 DAM_ENG1 Damaged Engine 1 STR_ENG2 Struck Engine 2 DAM_ENG2 Damaged Engine 2 STR_ENG3 Struck Engine 2 DAM_ENG3 Damaged Engine 3 STR_ENG4 Struck Engine 3 DAM_ENG3 Damaged Engine 4 DAM_ENG4 Damaged Engine 6 Engine ingested the bird/animal STR_PROP Damaged Propeller Struck Wing or Rotor DAM_WING_ROT Damaged Wing or Rotor DAM_WING_ROT Damaged Wing or Rotor DAM_WING_ROT Damaged Fine 1 Damaged Fine 2 Struck Fine 3 DAM_ENG4 Damaged Engine 5 Struck Fine 5 Struck Fine 6 DAM_ENG5 Damaged Fine 6 DAM_ENG5 Damaged Fine 6 DAM_ENG5		replacements and an extensive inspection is not necessary.					
S = substantial When the aircraft incurs damage or structural failure which adversely affects the structure strength, performance or flight characteristics of the aircraft and which would normally require major repair or replacement of the affected component. When the damage sustained makes it inadvisable to restore the aircraft to an airworthy condition. STR_RAD Struck radome DAM_RAD Struck vindshield DAM_WINDSHLD Struck windshield DAM_WINDSHLD Damaged windshield STR_NOSE DAM_NOSE DAM_ROSE STR_ENGI DAM_ENGI STR_ENGI DAM_ENGI STR_ENGI DAM_ENGI STR_ENG2 DAM_ENG2 STR_ENG2 DAM_ENG3 DAM_ENG3 DAM_ENG3 DAM_ENG3 DAM_ENG3 DAM_ENG3 DAM_ENG3 DAM_ENG4 DAM_ENG4 DAM_ENG4 DAM_ENG4 DAM_ENG4 DAM_ENG4 DAM_ENG4 DAM_ENG5 STR_ENG4 DAM_ENG4 DAM_ENG4 DAM_ENG5 STR_ENG6 DAM_ENG5 STR_ENG6 DAM_ENG6 STR_ENG6 DAM_ENG6 STR_ENG6 DAM_ENG6 DAM_ENG6 STR_ENG6 DAM_ENG6 STR_ENG6 DAM_ENG6 STR_ENG6 DAM_ENG6 STR_ENG6 DAM_ENG6 DAM_ENG6 STR_ENG6 DAM_ENG6 STR_ENG6 DAM_ENG6 STR_ENG6 DAM_ENG6 STR_ENG6 DAM_ENG6 STR_ENG6 DAM_GOT STR_WING_ROT STR_UNG_ROT STR_UNG_ROT DAM_AWING_ROT STR_UNG_ROT DAM_AWING_ROT STR_UNG_ROT DAM_AWING_ROT STR_UNG_ROT DAM_AWING_ROT STR_ENG DAM_GOT STR_ENG8 DAM_GOT STR_ENG8 DAM_GOT STR_ENG8 DAM_GOT STR_ENG8 DAM_GOT STR_ENG8 DAM_GOT STR_ENG8 DAM_GOT STR_LIG DAM_GOT STR_LIG DAM_GOT STR_LIG DAM_GOT STR_UNG_ROT DAM_AWING_ROT STR_UNG_ROT DAM_AWING_ROT STR_UNG_ROT DAM_AWING_ROT STR_UNG_ROT DAM_AWING_ROT STR_UNG_ROT DAM_AWING_ROT STR_UNG_ROT STR_UNG_ROT DAM_AWING_ROT STR_UNG_ROT STR	M? = uncertain level	The aircraft was damaged, but details as to the extent of the damage are					
the structure strength, performance or flight characteristics of the aircraft and which would normally require major repair or replacement of the affected component. D = Destroyed When the damage sustained makes it inadvisable to restore the aircraft to an airworthy condition. STR_RAD Struck radome DAM_RAD Damaged radome STR_WINDSHLD Damaged windshield DAM_WINDSHLD Damaged windshield STR_NOSE Struck nose DAM_NOSE Damaged nose STR_ENG1 Struck Engine 1 DAM_ENG1 Damaged Engine 1 STR_ENG2 Struck Engine 2 DAM_ENG2 Damaged Engine 2 STR_ENG3 Struck Engine 3 DAM_ENG3 Struck Engine 3 DAM_ENG4 Damaged Engine 3 STR_ENG4 Struck Engine 4 DAM_ENG4 Damaged Engine 4 NOSESTED Engine ingested the bird/ animal STR_PROP DAM_ENG4 Damaged Engine 4 NOSESTED Engine ingested the bird/ animal STR_PROP DAM_ENG9 Damaged Engine 5 STR_PROP Damaged Engine 6 STR_PROP Damaged Engine 6 STR_PROP Damaged Engine 7 STR_ENG8 Garden Propeller STR_WING_ROT Struck Wing or Rotor STR_FUSE Damaged Fuselage DAM_FUSE Damaged Fuselage DAM_FUSE Damaged Fuselage DAM_FUSE Damaged Fuselage STR_IG Struck Janding Gear DAM_FUSE Damaged Fuselage STR_TAIL Struck Tail DAM_TAIL Damaged Tail STR_LGHTS Struck Lights DAM_LGHTS Damaged Lights STR_CHHER Struck Uter than parts shown above DAM_OTHER ODAM_OTHER OTHER Struck Other than parts shown above OTHER_SPECIFY What part was struck other than those listed on the form SKY Type of cloud cover, if any PRECIP Precipitation PRECIP SPECIF of bird or other wildlife		lacking.					
which would normally require major repair or replacement of the affected component. D = Destroyed When the damage sustained makes it inadvisable to restore the aircraft to an airworthy condition. STR_RAD Struck radome DAM_RAD Damaged radome STR_WINDSHLD Struck windshield DAM_WINDSHLD Damaged windshield STR_NOSE Struck nose DAM_NOSE Damaged nose STR_ENGI Struck Engine 1 DAM_ENGI Damaged Engine 2 STR_ENGI DAM_ENGI Damaged Engine 2 STR_ENG2 Struck Engine 3 DAM_ENG3 Damaged Engine 3 STR_ENG3 Struck Engine 3 DAM_ENG3 Damaged Engine 3 STR_ENG4 Struck Engine 4 INGESTED Engine ingested the bird/ animal STR_PROP Damaged Fropeller STR_WING_ROT Damaged Wing or Rotor DAM_WING_ROT Damaged Wing or Rotor STR_FUSE Struck Fuselage DAM_IG Damaged Fuselage STR_LG Struck Landing Gear STR_LG Damaged Fuselage STR_LG Damaged Fuselage STR_LG Damaged Tisteslage DAM_LG Damaged Tisteslage STR_LG Struck Landing Gear STR_TAIL Damaged Tisteslage STR_TAIL Damaged Lights STR_OTHER Struck Lights DAM_LGHTS Damaged Lights STR_OTHER Struck Other than parts shown above OTHER_SPECIFY What part was struck other than those listed on the form SKY Type of cloud cover, if any PRECIP Precipitation Precipitation	S = substantial	When the aircraft incurs damage or structural failure which adversely affects					
Component. When the damage sustained makes it inadvisable to restore the aircraft to an airworthy condition. STR_RAD STR_RAD DAM_RAD DAM_BAD STR_UNDSHLD STR_WINDSHLD DAM_WINDSHLD DAM_WINDSHLD DAM_GE STR_ENOSE DAM_OSE DAM_OSE STR_ENGI STR_ENGI DAM_ENGI DAM_ENGI DAM_ENGI DAM_ENG2 DAM_ENG2 DAM_ENG2 DAM_ENG3 DAM_ENG3 DAM_ENG3 DAM_ENG3 DAM_ENG3 DAM_ENG3 DAM_ENG4 DAM_ENG4 DAM_ENG4 DAM_ENG4 DAM_ENG4 DAM_ENG4 DAM_ENG4 DAM_ENG5 STR_ENC4 DAM_ENG5 STR_ENC4 DAM_ENG6 STR_ENC5 DAM_ENG6 STR_ENC6 STR_ENC6 STR_ENC6 STR_ENC6 STR_ENC6 STR_ENC6 STR_ENC6 STR_ENC6 STR_ENC6 DAM_ENG3 DAM_ENG3 DAM_ENG3 DAM_ENG3 DAM_ENG3 DAM_ENG3 DAM_ENG3 DAM_ENG3 DAM_ENG4 DAM_ENG4 DAM_ENG4 DAM_ENG4 DAM_ENG5 STR_ENC6 STR_ENC9 STR_ENC9 STR_ENC9 STR_ENC9 STR_ENC9 DAM_GROT DAM_WING_ROT DAM_WING_ROT DAM_WING_ROT DAM_WING_ROT DAM_WING_ROT DAM_GROT STR_CILL STR_CIL		the structure strength, performance or flight characteristics of the aircraft and					
D = Destroyed When the damage sustained makes it inadvisable to restore the aircraft to an airworthy condition. STR_RAD Struck radome DAM_RAD Damaged radome STR_WINDSHLD Struck windshield DAM_WINDSHLD Damaged windshield STR_NOSE Struck nose DAM_NOSE Damaged nose STR_ENGI Struck Engine 1 DAM_ENGI Damaged Engine 1 STR_ENG2 Struck Engine 2 DAM_ENG2 Damaged Engine 2 STR_ENG3 Struck Engine 3 STR_ENG3 Damaged Engine 3 STR_ENG3 Damaged Engine 4 DAM_ENG4 Damaged Engine 4 DAM_ENG5 Struck Propeller DAM_ENG6 Damaged Engine 4 DAM_ENG6 Damaged Engine 4 DAM_ENG6 Struck Propeller STR_PROP Struck Propeller STR_WING_ROT Damaged Propeller STR_WING_ROT Damaged Fuselage STR_USE Struck Wing or Rotor STR_USE Damaged Fuselage DAM_USE Damaged Fuselage DAM_IG Damaged Lights STR_IAIL Struck Landing Gear DAM_LG Struck Lights STR_IAIL Damaged Lights STR_ICHTS Damaged Lights STR_OTHER Struck Other than parts shown above OTHER_SPECIFY Effect on flight other than those listed on the form SKY Type of cloud cover, if any PRECIES_ID International Civil Aviation Organization code for type of bird or other wildlife		which would normally require major repair or replacement of the affected					
airworthy condition. STR_RAD DAM_RAD DAM_RAD DAM_RAD Struck radome STR_WINDSHLD Struck windshield DAM_WINDSHLD DAM_aged windshield STR_NOSE Struck nose DAM_NOSE DAM_SOSE DAM_BOSE DAM_BOSE DAM_ENGI DAM_ENGI DAM_ENGI DAM_ENGI DAM_ENG2 DAM_ENG2 DAM_ENG2 DAM_ENG2 DAM_ENG3 Struck Engine 2 DAM_ENG3 Struck Engine 3 STR_ENG3 Struck Engine 4 DAM_ENG3 DAM_ENG3 DAM_ENG4 DAM_ENG5 STR_ENG4 DAM_ENG5 STR_ENG4 DAM_ENG5 STR_ENG4 DAM_ENG5 STR_ENG4 DAM_ENG5 STR_ENG4 DAM_ENG5 STR_ENG4 DAM_ENG5 STR_ENG6 DAM_ENG6 DAM_ENG6 STR_UNCA S		component.					
STR_RAD Struck radome DAM_RAD Damaged radome STR_WINDSHLD Struck windshield DAM_WINDSHLD Damaged windshield STR_NOSE Struck nose DAM_NOSE Damaged nose STR_ENGI Struck Engine 1 DAM_ENGI Damaged Engine 1 STR_ENG2 Struck Engine 2 DAM_ENG2 Damaged Engine 2 STR_ENG3 Struck Engine 3 DAM_ENG3 Damaged Engine 3 STR_ENG4 Struck Engine 4 DAM_ENG4 Damaged Engine 4 INGESTED Engine ingested the bird/ animal STR_PROP Damaged Propeller DAM_PROP Struck Wing or Rotor DAM_WING_ROT Damaged Wing or Rotor STR_USE Struck Landing Gear DAM_IG STR_LG Struck Landing Gear DAM_IG STR_TAIL Struck Tail DAM_TAIL Damaged Lights STR_IGHTS Damaged Lights STR_IGHTS Struck Lights DAM_IGHTS Damaged United Struck Lights DAM_OTHER Damaged Other than parts shown above DAM_OTHER Damaged Other than parts shown above DTHER_SPECIFY Effect on flight other than those listed on the form SKY PRECIES_ID International Civil Aviation Organization code for type of bird or other wildlife wildlife	D = Destroyed	When the damage sustained makes it inadvisable to restore the aircraft to an					
DAM_RAD Damaged radome STR_WINDSHLD STruck windshield STR_NOSE STR_NOSE STR_NOSE DAM_NOSE DAM_NOSE DAM_RENGI STR_ENGI DAM_ENGI DAM_ENGI STR_ENG2 DAM_ENG2 DAM_ENG2 DAM_ENG3 STR_ENG3 STR_ENG3 STR_ENG3 DAM_ENG3 STR_ENG3 DAM_ENG3 STR_ENG3 DAM_ENG4 DAM_ENG4 DAM_ENG4 DAM_ENG4 DAM_ENG5 STR_ENG4 STruck Engine 1 DAM_ENG4 DAM_ENG4 DAM_ENG5 STR_ENG5 STR_ENG5 STR_ENG5 STR_ENG6 STR_		airworthy condition.					
STR_WINDSHLD Struck windshield DAM_WINDSHLD Damaged windshield STR_NOSE Struck nose DAM_NOSE Damaged nose STR_ENGI Struck Engine 1 DAM_ENGI Damaged Engine 1 STR_ENG2 Struck Engine 2 DAM_ENG2 Damaged Engine 2 STR_ENG3 Struck Engine 3 DAM_ENG3 Damaged Engine 3 STR_ENG4 Struck Engine 4 DAM_ENG4 Damaged Engine 4 INGESTED Engine ingested the bird/ animal STR_PROP Struck Propeller DAM_PROP Damaged Propeller STR_WING_ROT Struck Wing or Rotor DAM_WING_ROT Damaged Wing or Rotor DAM_FUSE Damaged Fuselage STR_IG Struck Landing Gear DAM_LG Damaged Landing Gear STR_AIL Damaged Landing Gear DAM_LG Damaged Tail STR_CHTS Struck Lights DAM_CHTS Damaged Lights STR_OHTER Damaged Lights STR_OHTER Damaged Lights STR_OHTER Damaged Lights<	STR_RAD	Struck radome					
DAM_WINDSHLD STR_NOSE STruck nose DAM_NOSE Damaged nose STR_ENG1 Struck Engine 1 DAM_ENG1 DAM_ENG1 DAM_ENG2 Damaged Engine 2 DAM_ENG3 DAM_ENG3 Damaged Engine 3 STR_ENG3 DAM_ENG3 Damaged Engine 3 STR_ENG4 DAM_ENG4 DAM_ENG4 DAM_ENG4 DAM_ENG5 STR_ENG5 STR_ENG64 DAM_ENG64 DAM_ENG64 DAM_ENG64 DAM_ENG64 DAM_ENG64 DAM_ENG64 DAM_ENG64 DAM_ENG65 STR_PROP Struck Propeller STR_WING_ROT DAM_WING_ROT DAM_WING_ROT STR_ENG Struck Wing or Rotor STR_FUSE Struck Fuselage DAM_FUSE DAM_ENG5 STR_LG Struck Landing Gear DAM_LG STR_TAIL Struck Tail DAM_TAIL DAMAGED STR_LGHTS STR_LGHTS STR_OHLER STR_OHLE	DAM_RAD	Damaged radome					
STR_NOSE Struck nose DAM_NOSE Damaged nose STR_ENG1 Struck Engine 1 DAM_ENG1 Damaged Engine 1 STR_ENG2 Struck Engine 2 DAM_ENG2 Damaged Engine 2 STR_ENG3 Struck Engine 3 STR_ENG4 Damaged Engine 3 STR_ENG4 Damaged Engine 4 NGESTED Engine ingested the bird/ animal STR_PROP Struck Propeller DAM_PROP Damaged Propeller STR_WING_ROT Struck Wing or Rotor DAM_WING_ROT Damaged Wing or Rotor STR_LG Struck Landing Gear DAM_FUSE Damaged Fuselage STR_LG Struck Landing Gear DAM_LG Damaged Landing Gear STR_TAIL Struck Lights DAM_LGHTS Damaged Tail STR_LGHTS Struck Lights DAM_LGHTS Damaged Lights STR_OTHER Damaged Lights STR_OTHER Damaged Other than parts shown above DAM_LGHTS Damaged Other than parts shown above OTHER_SPECIFY What part was struck other than those listed on the fo	STR_WINDSHLD	Struck windshield					
DAM_NOSE STR_ENG1 Struck Engine 1 DAM_ENG1 DAM_ENG2 Damaged Engine 2 DAM_ENG2 Damaged Engine 2 STR_ENG3 Struck Engine 3 DAM_ENG3 Damaged Engine 3 STR_ENG4 DAM_ENG4 DAM_ENG5 STR_UNG ROT DAM_WING_ROT DAM_WING_ROT DAM_WING_ROT DAM_WING_ROT DAM_ENG4	DAM_WINDSHLD	Damaged windshield					
STR_ENG1Struck Engine 1DAM_ENG1Damaged Engine 1STR_ENG2Struck Engine 2DAM_ENG2Damaged Engine 2STR_ENG3Struck Engine 3DAM_ENG3Damaged Engine 3STR_ENG4Struck Engine 4DAM_ENG4Damaged Engine 4INGESTEDEngine ingested the bird/ animalSTR_PROPStruck PropellerDAM_PROPDamaged PropellerSTR_WING_ROTStruck Wing or RotorDAM_WING_ROTDamaged Wing or RotorSTR_USEStruck FuselageDAM_FUSEDamaged FuselageSTR_LGStruck Landing GearDAM_LGDamaged Landing GearSTR_TAILStruck LightsDAM_LGHTSStruck LightsDAM_LGHTSDamaged LightsSTR_OTHERStruck Other than parts shown aboveDAM_CHERDamaged Other than parts shown aboveOTHERSPECIFYWhat part was struck other than those listed aboveEFFECTEffect on flight other than those listed on the formSKYType of cloud cover, if anyPRECIPPrecipitationSPECIES_IDInternational Civil Aviation Organization code for type of bird or other	STR_NOSE	Struck nose					
DAM_ENG1	DAM_NOSE	Damaged nose					
STR_ENG2Struck Engine 2DAM_ENG2Damaged Engine 2STR_ENG3Struck Engine 3DAM_ENG3Damaged Engine 3STR_ENG4Struck Engine 4DAM_ENG4Damaged Engine 4INGESTEDEngine ingested the bird/ animalSTR_PROPStruck PropellerDAM_PROPDamaged PropellerSTR_WING_ROTStruck Wing or RotorDAM_WING_ROTDamaged Wing or RotorSTR_FUSEStruck FuselageDAM_FUSEDamaged FuselageSTR_LGStruck Landing GearDAM_LGDamaged Landing GearSTR_TAILStruck TailDAM_TAILDamaged TailSTR_LGHTSStruck LightsDAM_LGHTSDamaged LightsSTR_OTHERStruck Other than parts shown aboveDAM_LGHTSDamaged Other than parts shown aboveOTHER_SPECIFYWhat part was struck other than those listed aboveEFFECTEffect on flightEFFECT_OTHEREffect on flight other than those listed on the formSKYType of cloud cover, if anyPRECIPPrecipitationSPECIES_IDInternational Civil Aviation Organization code for type of bird or other wildlife	STR_ENG1	Struck Engine 1					
DAM_ENG2	DAM_ENG1	Damaged Engine 1					
STR_ENG3 Struck Engine 3 DAM_ENG3 Damaged Engine 3 STR_ENG4 Struck Engine 4 DAM_ENG4 Damaged Engine 4 INGESTED Engine ingested the bird/ animal STR_PROP Struck Propeller DAM_PROP Damaged Propeller STR_WING_ROT Struck Wing or Rotor DAM_WING_ROT Damaged Wing or Rotor STR_FUSE Struck Fuselage DAM_FUSE Struck Landing Gear DAM_LG Damaged Landing Gear STR_TAIL Struck Tail DAM_TAIL Damaged Tail STR_LGHTS Struck Lights DAM_LGHTS Struck Other than parts shown above DAM_OTHER Damaged Other than parts shown above OTHER_SPECIFY What part was struck other than those listed above EFFECT Effect on flight EFFECT_OTHER SPECIES_ID International Civil Aviation Organization code for type of bird or other wildlife	STR_ENG2	Struck Engine 2					
DAM_ENG3 Damaged Engine 3 STR_ENG4 Struck Engine 4 DAM_ENG4 Damaged Engine 4 INGESTED Engine ingested the bird/ animal STR_PROP Struck Propeller DAM_PROP Damaged Propeller STR_WING_ROT Struck Wing or Rotor DAM_WING_ROT Damaged Wing or Rotor STR_FUSE Struck Fuselage DAM_FUSE Damaged Fuselage STR_LG Struck Landing Gear DAM_LG Damaged Landing Gear STR_TAIL Struck Tail DAM_TAIL Struck Lights DAM_LGHTS Struck Lights DAM_LGHTS Damaged Lights STR_OTHER Struck Other than parts shown above OTHER_SPECIFY What part was struck other than those listed above EFFECT Effect on flight end of type of bird or other wildlife SPECIES_ID International Civil Aviation Organization code for type of bird or other wildlife	DAM_ENG2	Damaged Engine 2					
STR_ENG4Struck Engine 4DAM_ENG4Damaged Engine 4INGESTEDEngine ingested the bird/ animalSTR_PROPStruck PropellerDAM_PROPDamaged PropellerSTR_WING_ROTStruck Wing or RotorDAM_WING_ROTDamaged Wing or RotorSTR_FUSEStruck FuselageDAM_FUSEDamaged FuselageSTR_LGStruck Landing GearDAM_LGDamaged Landing GearSTR_TAILStruck TailDAM_TAILDamaged TailSTR_LGHTSStruck LightsDAM_LGHTSDamaged LightsSTR_OTHERStruck Other than parts shown aboveDAM_LGHTSDamaged Other than parts shown aboveOTHER_SPECIFYWhat part was struck other than those listed aboveEFFECTEffect on flightEFFECT_OTHEREffect on flight other than those listed on the formSKYType of cloud cover, if anyPRECIPPrecipitationSPECIES_IDInternational Civil Aviation Organization code for type of bird or other wildlife	STR_ENG3	Struck Engine 3					
DAM_ENG4 Damaged Engine 4 INGESTED Engine ingested the bird/ animal STR_PROP Struck Propeller DAM_PROP Damaged Propeller STR_WING_ROT Struck Wing or Rotor DAM_WING_ROT Damaged Wing or Rotor STR_FUSE Struck Fuselage DAM_FUSE Damaged Fuselage STR_LG Struck Landing Gear DAM_LG Damaged Tail STR_TAIL Struck Tail DAM_TAIL Damaged Tail STR_LGHTS Struck Lights DAM_LGHTS Struck Lights DAM_LGHTS Damaged Lights STR_OTHER Struck Other than parts shown above OTHER_SPECIFY What part was struck other than those listed above EFFECT EFFECT OTHER Effect on flight EFFECT_OTHER Effect on flight other than those listed on the form SKY Type of cloud cover, if any PRECIP Precipitation SPECIES_ID International Civil Aviation Organization code for type of bird or other wildlife	DAM_ENG3	Damaged Engine 3					
INGESTED Engine ingested the bird/ animal STR_PROP Struck Propeller DAM_PROP Damaged Propeller STR_WING_ROT DAM_WING_ROT DAM_WING_ROT DAM_ESE Struck Fuselage DAM_FUSE Damaged Fuselage STR_LG DAM_LG DAM_EG STR_LG S	STR_ENG4						
STR_PROPStruck PropellerDAM_PROPDamaged PropellerSTR_WING_ROTStruck Wing or RotorDAM_WING_ROTDamaged Wing or RotorSTR_FUSEStruck FuselageDAM_FUSEDamaged FuselageSTR_LGStruck Landing GearDAM_LGDamaged Landing GearSTR_TAILStruck TailDAM_TAILDamaged TailSTR_LGHTSStruck LightsDAM_LGHTSDamaged LightsSTR_OTHERStruck Other than parts shown aboveDAM_OTHERDamaged Other than parts shown aboveOTHER_SPECIFYWhat part was struck other than those listed aboveEFFECTEffect on flightEFFECT_OTHEREffect on flight other than those listed on the formSKYType of cloud cover, if anyPRECIPPrecipitationSPECIES_IDInternational Civil Aviation Organization code for type of bird or other wildlife	_						
DAM_PROP Damaged Propeller STR_WING_ROT Struck Wing or Rotor DAM_WING_ROT Damaged Wing or Rotor STR_FUSE Struck Fuselage DAM_FUSE Damaged Fuselage STR_LG Struck Landing Gear DAM_LG Damaged Landing Gear STR_TAIL Struck Tail DAM_TAIL Damaged Tail STR_LGHTS Struck Lights DAM_LGHTS Damaged Lights STR_OTHER Struck Other than parts shown above DAM_OTHER Damaged Other than parts shown above OTHER_SPECIFY What part was struck other than those listed above EFFECT Effect on flight EFFECT_OTHER Effect on flight other than those listed on the form SKY Type of cloud cover, if any PRECIP Precipitation SPECIES_ID International Civil Aviation Organization code for type of bird or other wildlife							
STR_WING_ROTStruck Wing or RotorDAM_WING_ROTDamaged Wing or RotorSTR_FUSEStruck FuselageDAM_FUSEDamaged FuselageSTR_LGStruck Landing GearDAM_LGDamaged Landing GearSTR_TAILStruck TailDAM_TAILDamaged TailSTR_LGHTSStruck LightsDAM_LGHTSDamaged LightsSTR_OTHERStruck Other than parts shown aboveDAM_OTHERDamaged Other than parts shown aboveOTHER_SPECIFYWhat part was struck other than those listed aboveEFFECTEffect on flightEFFECT_OTHEREffect on flight other than those listed on the formSKYType of cloud cover, if anyPRECIPPrecipitationSPECIES_IDInternational Civil Aviation Organization code for type of bird or other wildlife	_	*					
DAM_WING_ROT STR_FUSE Struck Fuselage DAM_FUSE DAM_EUSE STR_LG DAM_LG STR_TAIL DAM_TAIL DAM_TAIL STR_LGHTS STR_OTHER DAM_OTHER DAM_OTHER DAM_OTHER DAM_OTHER DAM_OTHER DAM_OTHER STR_CT Effect on flight EFFECT Effect on flight other than those listed on the form SKY PRECIP Precipitation SPECIES_ID International Civil Aviation Organization code for type of bird or other wildlife	_						
STR_FUSE Struck Fuselage DAM_FUSE Damaged Fuselage STR_LG Struck Landing Gear DAM_LG Damaged Landing Gear STR_TAIL Struck Tail DAM_TAIL Damaged Tail STR_LGHTS Struck Lights DAM_LGHTS Damaged Lights STR_OTHER Struck Other than parts shown above DAM_OTHER Damaged Other than parts shown above OTHER_SPECIFY What part was struck other than those listed above EFFECT Effect on flight EFFECT_OTHER Effect on flight other than those listed on the form SKY Type of cloud cover, if any PRECIP Precipitation SPECIES_ID International Civil Aviation Organization code for type of bird or other wildlife		· · · · · · · · · · · · · · · · · · ·					
DAM_FUSE STR_LG Struck Landing Gear DAM_LG Damaged Landing Gear STR_TAIL Struck Tail DAM_TAIL DAM_TAIL STR_LGHTS Struck Lights DAM_LGHTS DAM_LGHTS STR_OTHER DAM_OTHER DAM_OTHER OTHER_SPECIFY Effect on flight EFFECT_OTHER SKY PRECIP SYECIES_ID International Civil Aviation Organization code for type of bird or other wildlife							
STR_LG DAM_LG Damaged Landing Gear STR_TAIL Struck Tail DAM_TAIL DAM_TAIL Damaged Tail STR_LGHTS Struck Lights DAM_LGHTS DAM_LGHTS Damaged Lights STR_OTHER Damaged Other than parts shown above DAM_OTHER Damaged Other than those listed above EFFECT Effect on flight EFFECT_OTHER SKY Type of cloud cover, if any PRECIP Precipitation SPECIES_ID International Civil Aviation Organization code for type of bird or other wildlife	STR_FUSE	· · · · · · · · · · · · · · · · · · ·					
DAM_LG STR_TAIL Struck Tail DAM_TAIL DAM_TAIL DAM_STR_LGHTS Struck Lights DAM_LGHTS DAM_LGHTS DAM_LGHTS DAM_OTHER DAM_OTHER DAM_OTHER DAM_OTHER DAM_OTHER DEFFECT Effect on flight EFFECT_OTHER EFFECT_OTHER SKY Type of cloud cover, if any PRECIP SPECIES_ID International Civil Aviation Organization code for type of bird or other wildlife	_						
STR_TAIL DAM_TAIL DAM_TAIL Damaged Tail STR_LGHTS Struck Lights DAM_LGHTS Damaged Lights STR_OTHER Struck Other than parts shown above DAM_OTHER Damaged Other than parts shown above OTHER_SPECIFY What part was struck other than those listed above EFFECT Effect on flight EFFECT_OTHER SKY Type of cloud cover, if any PRECIP Precipitation SPECIES_ID International Civil Aviation Organization code for type of bird or other wildlife	_						
DAM_TAIL STR_LGHTS Struck Lights DAM_LGHTS Damaged Lights STR_OTHER Struck Other than parts shown above DAM_OTHER Damaged Other than parts shown above OTHER_SPECIFY What part was struck other than those listed above EFFECT Effect on flight EFFECT_OTHER SKY Type of cloud cover, if any PRECIP Precipitation SPECIES_ID International Civil Aviation Organization code for type of bird or other wildlife	_	· · · · · · · · · · · · · · · · · · ·					
STR_LGHTS DAM_LGHTS Damaged Lights STR_OTHER Struck Other than parts shown above DAM_OTHER Damaged Other than parts shown above OTHER_SPECIFY What part was struck other than those listed above EFFECT Effect on flight EFFECT_OTHER SKY Type of cloud cover, if any PRECIP SPECIES_ID International Civil Aviation Organization code for type of bird or other wildlife	_						
DAM_LGHTS STR_OTHER Struck Other than parts shown above DAM_OTHER Damaged Other than parts shown above OTHER_SPECIFY What part was struck other than those listed above EFFECT Effect on flight EFFECT_OTHER SKY Type of cloud cover, if any PRECIP Precipitation SPECIES_ID International Civil Aviation Organization code for type of bird or other wildlife	_	· · · · · · · · · · · · · · · · · · ·					
STR_OTHER DAM_OTHER Damaged Other than parts shown above OTHER_SPECIFY What part was struck other than those listed above EFFECT Effect on flight EFFECT_OTHER SKY Type of cloud cover, if any PRECIP Precipitation SPECIES_ID International Civil Aviation Organization code for type of bird or other wildlife	_						
DAM_OTHER Damaged Other than parts shown above OTHER_SPECIFY What part was struck other than those listed above EFFECT Effect on flight EFFECT_OTHER Effect on flight other than those listed on the form SKY Type of cloud cover, if any PRECIP Precipitation SPECIES_ID International Civil Aviation Organization code for type of bird or other wildlife	_						
OTHER_SPECIFY EFFECT Effect on flight EFFECT_OTHER Effect on flight other than those listed on the form SKY Type of cloud cover, if any PRECIP Precipitation SPECIES_ID International Civil Aviation Organization code for type of bird or other wildlife	_						
EFFECT Effect on flight EFFECT_OTHER Effect on flight other than those listed on the form SKY Type of cloud cover, if any PRECIP Precipitation SPECIES_ID International Civil Aviation Organization code for type of bird or other wildlife	_						
EFFECT_OTHER SKY Type of cloud cover, if any PRECIP PRECIES_ID International Civil Aviation Organization code for type of bird or other wildlife	-	<u>*</u>					
SKY Type of cloud cover, if any PRECIP Precipitation SPECIES_ID International Civil Aviation Organization code for type of bird or other wildlife							
PRECIP Precipitation SPECIES_ID International Civil Aviation Organization code for type of bird or other wildlife	_						
SPECIES_ID International Civil Aviation Organization code for type of bird or other wildlife							
wildlife							
	SPECIES_ID						
STECIES COMMON Name for one whome	CDECIEC						
	SI ECIES	Common name for one of outer whatte					

Column name	Explanation of Column Name and Codes
BIRDS_SEEN	Number of birds/wildlife seen by pilot
BIRDS_STRUCK	Number of birds/wildlife struck
SIZE	Size of bird as reported by pilot is a relative scale. Entry should reflect the perceived size as opposed to a scientifically determined value. If more than one species was struck, larger bird is entered.
WARNED	Pilot warned of birds/wildlife
COMMENTS	As entered by database manager. Can include name of aircraft owner, types of reports received, updates, etc.
REMARKS	Most of remarks are from the form but some are data entry notes and are usually in parentheses.
AOS	Time aircraft was out of service in hours. If unknown, it is blank.
COST REPAIRS	Estimated cost of repairs of replacement in dollars (USD)
COST OTHER	Estimated other costs, other than those in previous field in dollars (USD).
_	May include loss of revenue, hotel expenses due to flight cancellation, costs of fuel dumped, etc.
COST REPAIRS INFL ADJ	Costs adjusted for inflation
COST OTHER INFL ADJ	Other cost adjusted for inflation
REPORTED NAME	Name(s) of person(s) filing report
REPORTED TITLE	Title(s) of person(s) filing report
REPORTED DATE	Date report was written
SOURCE	Type of report. Note: for multiple types of reports this will be indicated as Multiple. See "Comments" field for details
PERSON	Only one selection allowed. For multiple reports, see field "Reported Title"
NR INJURIES	Number of people injured
NR FATALITIES	Number of human fatalities
LUPDATE	Last time record was updated
TRANSFER	Unused field at this time
INDICATED_DAMAGE	Indicates whether or not aircraft was damaged

3.3 Explore Data

3.3.1 Data Exploration Report

This report will be part of the following documents:

- Preliminary Report
- Final Paper

3.4 Verify Data Quality

3.4.1 Data Quality Report

This report will be part of the following documents:

- Preliminary Report
- Final Paper

4 Contributors

Student: Gabor Horvath Mentor: Gergely Daroczi

Contents

I	Intr	oduction	1							
2	Busi	Business understanding 2								
	2.1									
		2.1.1 Business Objectives	2							
		2.1.2 Business Success Criteria	2							
	2.2	Assess Situation	2							
		2.2.1 Inventory of resources	2							
		2.2.2 Requirements, Assumptions, and Constraints	2							
		2.2.3 Risks and Contingencies	2							
		2.2.4 Terminology	2							
		2.2.5 Costs and Benefits	3							
	2.3	Determine Data Mining Goals	3							
		2.3.1 Data Mining Goals	3							
		2.3.2 Data Mining Success Criteria	3							
	2.4									
		2.4.1 Project Plan	3							
		2.4.2 Initial Assessment of Tools and Techniques	3							
3	Data	Understanding 5								
	3.1 Collect Initial Data									
		3.1.1 Initial Data Collection Report	5							
	3.2	Describe Data	5							
		3.2.1 Data Description Report	5							
	3.3	Explore Data	10							
		3.3.1 Data Exploration Report	10							
	3.4	Verify Data Quality	10							
		3.4.1 Data Quality Report	10							
4	Con	atributors	11							
Re	feren	aces	13							

References

Shearen 13–22.	r, Colin.	2000.	"The Crisp-D	m Model - the	New Bluepr	int for Data	Mining." Joi	ırnal of Data	Warehousing 5	5 (4)